E1.28:ONWI-118/ app.

ONWI-118

ORIGINAL

Gulf Coast Salt Domes
Geologic Area Characterization Report
East Texas Study Area

Volume III
Appendix

July 1982

COMPLETED
225

Law Engineering Testing Company
2749 Delk Road, S.E.
Marietta, GA 30067

ONWI
Office of Nuclear Waste Isolation
BATTELLE Project Management Division

BIBLIOGRAPHIC DATA

Law Engineering Testing Company, 1982. *Gulf Coast Salt Domes Geologic Area Characterization Report*, ONWI-118, Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus, OH.

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Gulf Coast Salt Domes
Geologic Area Characterization Report
East Texas Study Area

Volume III
Appendix

July 1982

Law Engineering Testing Company
2749 Delk Road, S.E.
Marietta, GA 30067

This report was prepared by Law Engineering Testing Company under Subcontract E512-00400 with Battelle Project Management Division, Office of Nuclear Waste Isolation under Contract No. DE-AC06-RLO1830-ONWI with the U.S. Department of Energy. This contract was administered by the Battelle Office of Nuclear Waste Isolation.

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II

VOLUME III
TABLE OF CONTENTS

	Page
List of Tables	v
List of Figures	vii
List of Subcontracted Data Contributors	ix
Conversion Factors	xiii
Abbreviations and Acronyms	xiv
APPENDIX A - BORINGS	A-1-1
A-1 Deep Boring Data	A-1-1
A-2 Shallow Boring Data	A-2-1
A-3 Near-Dome Well Data	A-3-1
A-4 Study Area Well Data	A-4-1
A-5 Brine Disposal Wells	A-5-1
APPENDIX B - SAMPLE ANALYSES	B-1-1
APPENDIX C - GROUND WATER	C-1-1
C-1 Aquifer Field Test Methods	C-1-1
C-2 Water Level Monitoring	C-2-1
C-3 Water Sampling Techniques	C-3-1
C-4 Flood Plain Delineation	C-4-1
APPENDIX D - SURFACE GEOLOGY	D-1-1
D-1 Remote Sensing	D-1-1
D-2 Terrace and Geologic Mapping Data	D-2-1
APPENDIX E - GEOPHYSICS	E-1-1
E-1 Resistivity Vertical Soundings	E-1-1
E-2 Resistivity Horizontal Profiles	E-2-1
E-3 Near-Dome Gravity	E-3-1
E-4 High Resolution Seismic	E-4-1
APPENDIX F - MICROSEISMICITY	F-1-1
F-1 Microseismic Data	F-1-1
APPENDIX G - SEISMICITY	G-1-1
G-1 Seismicity	G-1-1

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IV

VOLUME III
LIST OF TABLES

Table No.	Appendix A	Page
A-1.1	Deep Boring Data Summary DOE Settlemyre TOG-1	A-1-3
A-1.2	Deep Boring Data Summary DOE Settlemyre TOH-2A	A-1-7
A-2.1	Shallow Boring Record - TOE-101	A-2-4
A-2.2	Shallow Boring Record - TOE-102	A-2-8
A-2.3	Shallow Boring Record - TOE-103	A-2-12
A-2.4	Shallow Boring Record - TOE-104	A-2-16
A-2.5	Shallow Boring Record - TOE-105	A-2-19
A-2.6	Shallow Boring Record - TOE-107	A-2-23
A-2.7	Shallow Boring Record - TOE-108	A-2-26
A-2.8	Shallow Boring Record - TOE-112	A-2-30
A-2.9	Shallow Boring Record - TOE-115	A-2-31
A-2.10	Shallow Boring Record - TOE-117	A-2-37
A-2.11	Shallow Boring Record - TOE-121	A-2-38
A-3.1	Hydrocarbon Wells Within a 5-Mile Radius of Oakwood Dome	A-3-7
A-3.2	Hydrocarbon Wells Within a 5-Mile Radius of Keechi Dome	A-3-9
A-4.1	Study Area Well Data	A-4-7
A-5.1	Summary of Disposal Wells in the East Texas Study Area and Vicinity	A-5-5

Appendix C

C-1.1	Aquifer Test Well Construction Summary	C-1-4
C-1.2	Summary of Aquifer System Properties in the Texas Study Area	C-1-6

VOLUME III
LIST OF TABLES (Continued)

Table No.	Title	Page
C-2.1	Water Level Measurements - TOG-1WS	C-2-2
C-2.2	Water Level Measurements - TOH-2A	C-2-3
C-2.3	Water Level Measurements - TOH-2A0	C-2-4
C-2.4	Water Level Measurements - TOH-2D0	C-2-5
C-2.5	Water Level Measurements - TOH-2D2	C-2-6
C-2.6	Water Level Measurements - TOH-5D	C-2-7
	Appendix D	
D-1.1	Aerial Photographs and Imagery	D-1-3
	Appendix E	
E-1.1	Pseudologs of Electrical Resistivity Vertical Soundings	E-1-3
	Appendix F	
F-1.1	Potential Seismic Events Recorded February 3 through August 20, 1980	F-1-4
	Appendix G	
G-1.1	Regional Historic Seismicity	G-1-3

VOLUME III
LIST OF FIGURES

Figure No.	Title	Page
	Appendix A	
A-3.1	Location Map of Hydrocarbon Wells Within 5-Mile Radius of Oakwood Dome	A-3-3
A-3.2	Location Map of Hydrocarbon Wells Within 5-Mile Radius of Keechi Dome	A-3-5
A-4.1	Location Map of Wells Used in Analyses	A-4-3
A-5.1	Location Map of Brine Disposal Wells	A-5-3
	Appendix C	
C-1.1	Typical Well Construction	C-1-5
C-3.1	Initial Water Quality Apparatus for Sampling Under Anaerobic Conditions	C-3-4
	Appendix E	
E-1.1	Location Map of Vertical Resistivity Soundings	E-1-9
E-2.1	Location and Apparent Resistivity Map of Horizontal Profiles	E-2-2
	Appendix F	
F-1.1	Location of Seismograph Used to Monitor Microseismic Events	F-1-3
	Appendix G	
G-1.1	Epicentral Location Map	G-1-12

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VOLUME III
LIST OF SUBCONTRACTED DATA CONTRIBUTORS

SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Dr. J. Aghassy	Report - Geomorphic Expression of Salt Domes	TX, LA, MS
Amoco Production Co.	Downhole Velocity Surveys	LA
Ana-Log, Inc.	Mud Logging	TX
Analytical Logging, Inc.	Mud Logging	MS
Dr. S. Aronow	Report-Erosion and Alluviation	TX, LA, MS
Austin Exploration, Inc.	Field Gravity Surveys	LA, MS
Dr. J. Braunstein	Paleontological Reports-Area Characterization Deep Borings	MS
C. H. Burt, Inc.	Seismic Reflection Data Processing	TX, LA
Dr. E. S. K. Chian	Chemical Analyses of Salt Core	MS
Consolidated Lab.	Mud Logging	LA, MS
Core Laboratories, Inc.	Mud Logging; Determining Physical and Chemical Properties of Sidewall Cores	TX, LA, MS
Culpepper Testing Laboratories	Water and Gas Chemistry Analyses	MS
DDR International	Scheduling, Budget, and Cost Accounting	TX, LA, MS
Daedalus Enterprises, Inc.	Collected Thermal Infrared Image Data	TX, LA, MS
Dresser Industries, Inc.	Geophysical Well Logging	MS
Exploration Techniques, Inc.	Interpretation of Gravity Data and Salt Dome Modeling	TX, LA, MS
GTS Corporation	Seismic Data Broker	LA, MS
Dr. E. Gavish	Mineralogic Analysis of Field Samples	LA

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LIST OF SUBCONTRACTED DATA CONTRIBUTORS (Continued)

SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Gearhart-Owen Wireline Services	Geophysical Well Logging	LA
Geo-Log, Inc.	Geophysical Well Logging	TX
Geomap Company	Structural Geologic Maps for Study Areas	TX, LA, MS
Geosource, Inc. Petty Ray Division	Seismic Data Broker	LA, MS
Dr. L. deA. Gimbrede	Peleontological Reports-Area Characterization Borings	LA
Griswold Engineering	Field Surveying	LA
Harris Aerial Surveys	Low Altitude Color Infrared Imagery and Black and White Aerial Photos	TX
Dr. W. C. Isphording	Report-Heavy Mineral Analyses of Shallow Boring Samples	MS
Dr. R. O. Kehle	Report-Salt Dome Growth Rate	TX, LA, MS
Dr. D. H. Kupfer	Report-Salt Dome Internal Structure	TX, LA, MS
Layne-Central Co.	Well Logging	MS
Location Sample Service, Inc.	Mud Logging	MS
Mark Hurd Surveys	Black and White Aerial Photos	LA
Dr. C. W. Meade	Report-Salt Exploitation of Rayburns Salt Dome	LA
Mr. F. F. Mellen	Report-Mineral Resources in Cypress Creek Domal Area	MS
Dr . W. R. Muehlberger	Report-Winnfield and Grand Saline Salt Mines	TX, LA
Dr. G. E. Murray	Report-Mineral Resources Near the Eight Candidate Domes	TX, LA MS

VOLUME III
LIST OF SUBCONTRACTED DATA CONTRIBUTORS (Continued)

SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Dr. O. L. Paulson	Paleontological Reports-Area Characterization Borings	MS
Petrophysics, Inc.	Synthetic Seismograms	TX, LA, MS
Prokop Exploration, Inc.	Gravity Data Broker	LA
Richardson Seismic Services, Inc.	Seismic Data Broker	TX
Ridgways, Inc.	Geophysical Well Log Broker	TX, LA, MS
Dr. R. W. Rodgers	Report-Salt Dome Growth	TX, LA, MS
Schlumberger Well Services	Geophysical Well Logging	TX
Seismic and Digital Concepts, Inc.	Seismic Reprocessing	MS
Sigma Exploration, Ltd.	High Resolution Seismic Data Acquisition	MS
Southwestern Laboratories	Water Chemistry Analyses	LA
Teledyne Exploration	Seismic Data Broker	LA
Thompson & Associates, Inc.	Field Surveying	TX
United Aerial Mapping	Topographic Mapping	LA
University of Arizona	Radiocarbon Dating	LA
University of Southern Mississippi	Reports-Terrace Mapping Report-Salt Core Petrography	MS
Dr. J. R. Wadsworth, Jr.	Geomorphic Consultant	TX, LA

VOLUME III
LIST OF SUBCONTRACTED DATA CONTRIBUTORS (Continued)

SUBCONTRACTOR/ CONSULTANT	TASK	STATE
Dr. C. E. Weaver	Report-Clay Mineralogy of Shallow Boring Samples Report-Salt Core Petrology	MS
Dr. R. A. Welch	Report-Remote Sensing	LA, MS
Williams and Broom Surveyors	Field Surveying	MS
Willisco New Orleans, La.	Seismic Data Broker	MS
Willisco Houston, Tx.	Seismic Data Broker	TX

CONVERSION FACTORS

The conversion factors used in this report are based on the following table. In most instances, the metric-to-standard measurement conversions represent rounded-off figures in this report.

To convert from	To	Multiply by
millimeter (mm)	inch (in)	0.03937
meter (m)	foot (ft)	3.281
kilometer (km)	mile (mi)	0.6214
meter^2 (m^2)	foot^2 (ft^2)	10.76
kilometer^2 (km^2)	mile^2 (mi^2)	0.3861
hectare (-)	acre (-)	2.471
kilogram (kg)	pound (lb)	2.205
tonne (-)	ton (-)	0.893
liter (l)	gallon (gal)	0.2642
kilometers^3 (km^3)	miles^3 (mi^3)	0.244
kilopascal (kPa)	atmosphere (atm)	0.009869
milligrams per liter (mg/l)	parts per million (ppm)	1.0
liter per second (l/sec)	gallon per minute (gal/min)	15.85

ABBREVIATIONS AND ACRONYMS

AEC	Atomic Energy Commission
BEG	Texas Bureau of Economic Geology
BMI	Battelle Memorial Institute
BNI	Bechtel National, Inc.
DOE	Department of Energy
ERTS	Earth Resources Technology Satellite
FEA	Federal Energy Administration
LANDSAT	Earth Resources Technology Satellite (formerly ERTS)
LETCo	Law Engineering Testing Company
LSU/IES	Louisiana State University/Institute for Environmental Studies
MGAI	Mellen Geological Associates, Inc.
MM	Modified Mercalli
MMI	Modified Mercalli Intensity
MSGS	Mississippi State Geological Survey
MSL	Mean Sea Level
NAS	National Academy of Science
NRC	Nuclear Regulatory Commission
NSAI	Netherland, Sewell and Associates, Incorporated
NWTS	National Waste Terminal Storge
ONWI	Office of Nuclear Waste Isolation of Battelle Memorial Institute
ORNL	Oak Ridge National Laboratories
OWI	Office of Waste Isolation/Union Carbide Corp.
SCS	Soil Conservation Service
TAB	Technical Advisory Board
TNRIS	Texas Natural Resource Information System
USGS	United State Geological Survey
USM	University of Southern Mississippi

APPENDIX A

Borings

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EAST TEXAS STUDY AREA

APPENDIX A-1

DEEP BORING DATA

Three deep wells were drilled under the supervision of Law Engineering Testing Company (LETCo) between July and December of 1979 at two sites in the East Texas Study Area. The data from these wells, drilled from 413 to 1,036 meters (1,356 to 3,400 ft) deep, helped to provide a better understanding of the stratigraphy, lithology, and ground-water hydrology of the region.

A deep boring data summary from the deepest well at each of the two sites is presented in Tables A-1.1 and A-1.2. Included in the summaries are lithologic descriptions of drill cuttings and rock cores, representative geophysical logs, and other pertinent data.

EAST TEXAS STUDY AREA

APPENDIX A-1

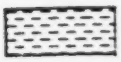
DEEP BORING DATA

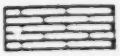
KEY TO LITHOLOGIC SYMBOLS

GRAVEL

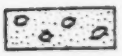
SAND

SILT OR SILTSTONE


CLAY, CLAYSTONE, SHALE OR MUDSTONE


LIMESTONE OR MARLSTONE

DOLOMITE


CAPROCK (ANHYDRITE AND GYPSUM)

SALT

LIGNITE

BEST DOCUMENT AVAILABLE

GROUP	FORMATION	LITHOLOGY
CLAIBORNE	*1	SAND: WHITE TO YELLOWISH-BROWN, FINE TO VERY FINE-GRAINED UNCONSOLIDATED, WITH TRACES OF IRONSTONE, GLAUCONITE, LIGNITE, AND LIMONITIC AND HEMATITIC CLAYS, LOCALLY INTERBEDDED WITH:
	CARRIZO	SILT: LIGHT YELLOW TO BROWN, CLAYEY OR SANDY, FRIABLE TO HARD, TRACE MICA, LOCALLY CALCAREOUS.
WILCOX		SILTY SAND: MEDIUM GRAY, VERY FINE TO FINE - GRAINED, WITH GRAY SILT MATRIX, TRACES OF LIGNITE AND MICA UNDERLAIN BY:
		SAND: CLEAR TO WHITE, FROSTED, MEDIUM TO FINE-GRAINED, UNCONSOLIDATED, CLEAN, WELL SORTED, TRACES OF LIGNITE AND PYRITE
		SAND: LIGHT TO MEDIUM GRAY, MEDIUM TO VERY FINE-GRAINED, MODERATELY FRIABLE TO UNCONSOLIDATED WITH TRACES OF MICA, PYRITE, AND LIGNITE
		SILTSTONE: LIGHT TO DARK GRAY, ARGILLACEOUS TO LOCALLY SANDY, SOFT TO MODERATELY HARD, MINOR LIGNITE, TRACES OF PYRITE, AND CHALCOPYRITE
		CLAYSTONE: LIGHT TO MEDIUM GRAY
		LIMESTONES: WHITE TO YELLOWISH GRAY, MICRO-CRYSTALLINE TO CRYPTOCRYSTALLINE VITREOUS TO SUCROSIC LOCALLY CHALKY TRACES OF PYRITE
		LIGNITE: FEW BEDS BETWEEN 500-600 FT
	CAPROCK	LIMESTONE: MEDIUM TO DARK GRAY FINELY CRYSTALLINE TO CRYPTO-CRYSTALLINE, WITH VUGS RANGING IN SIZE FROM 0.25 MM TO SEVERAL CM, INTERBANDED WITH WHITE TO YELLOWISH-BROWN CALCITE. MAJOR SPARITE AND MINOR FLUORITE IN VUGS
		ANHYDRITE: MEDIUM TO DARK GRAY, SUCROSIC TO VITREOUS, LOCALLY TRANSLUCENT, MINOR SALT INCLUSIONS
	SALT	HALITE: CLEAR TO LIGHT GRAY, WITH ANHYDRITE INCLUSIONS

LITHOLOGIC SYMBOLS

NO CUTTINGS

CORED INTERVAL

SIDEWALL CORES

SCREENED INTERVAL

100

161

ELEVATION X 100 (FEET)

+2

MSL

-2

-4

-6

-8

DEPTH X 100 (FEET)

2

4

6

8

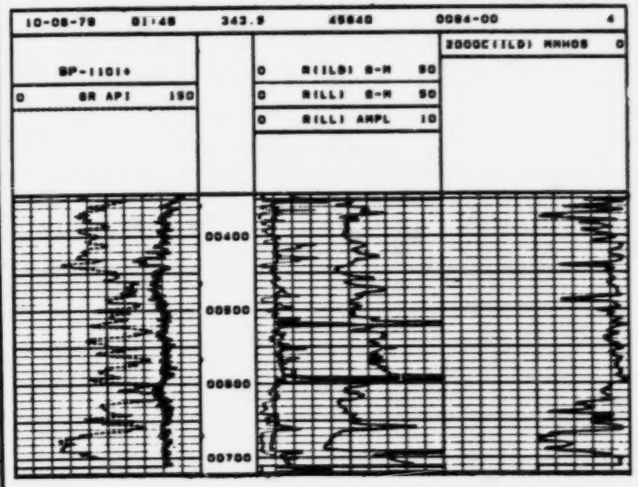
10

12

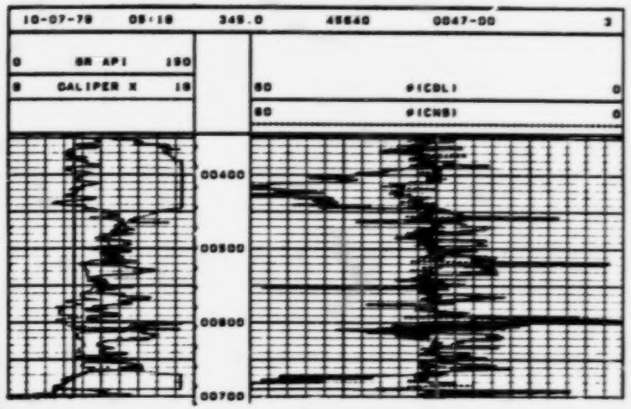
TD

TD

DUAL INDUCTION - LATEROLOG
WITH LINEAR CORRELATION LOG



COMPENSATED DENSITY
COMPENSATED NEUTRON
LOG



ELEVATION X 100 (FEET)

+2

MSL

-2

-4

-6

-10

ELEVATION (FT.): GL 359.86 KB 370.86 TOTAL DEPTH (FT.) 1355.71
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: 1000' FNWL, 700' FSWL, H. COOPER SURVEY, A-677, FREESTONE COUNTY, TEXAS (OAKWOOD DOME)
NOTE: DEEPER LOGS WERE RUN BUT WERE LOST BY LOGGING SUBCONTRACTOR
*1 REKLAW FORMATION

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REVISED ____ DATE ____
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T-1595A-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SETTLEMYRE TOG-1
TABLE NO. A-1.1
JOB NO. MV9500 PAGE 1 OF 2

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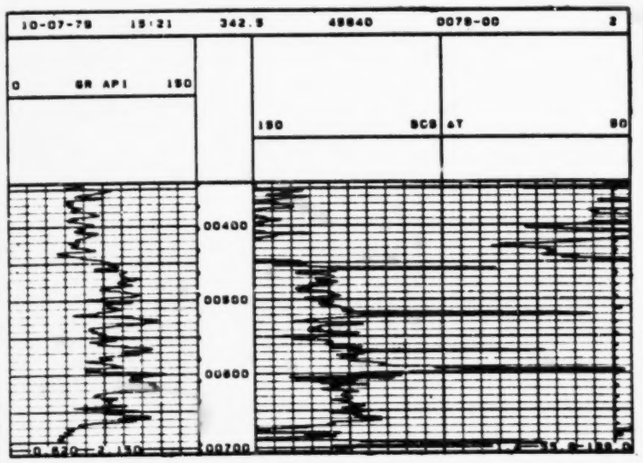
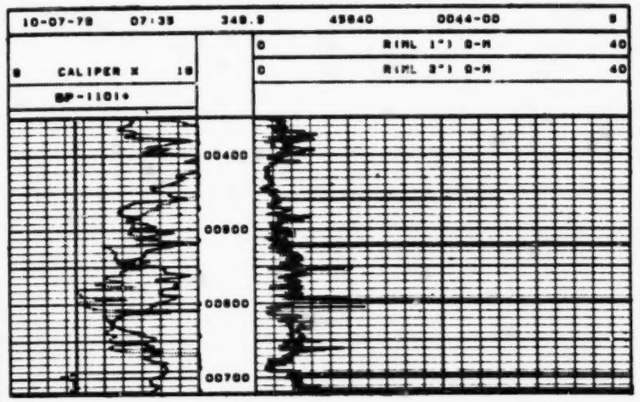
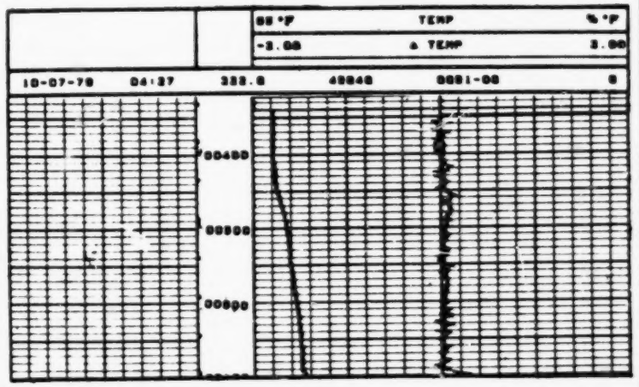
GROUP	FORMATION	ELEVATION X 100 (FEET)	BOREHOLE COMPENSATED SONIC LOG	MICRO-ELECTRICAL LOG	DIFFERENTIAL TEMPERATURE LOG	DEPTH X 100 (FEET)	ELEVATION X 100 (FEET)	COMMENTS
CLAIBORNE	#1							
	CARRIZO							
WILCOX		+2				2	+2	
		MSL				4	MSL	
		-2				6	-2	
	CAPROCK	-4				8	-4	
		-6				10	-6	
	SALT	-8				12	-8	
		-10				14	-10	
		-12				16	-12	

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REVISED _____ DATE _____
APPROVED GHF DATE 12/22/80

T-1595B-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SETTLEMYRE TOG-1
TABLE NO. A-1.1
JOB NO. MV 9700 PAGE 2 OF 2

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GROUP	FORMATION	LITHOLOGY
CLAIBORNE	QUEEN CITY	SAND: CLEAR TO ORANGE, MEDIUM TO FINE GRAINED. TRACES OF HEMATITE, LIMONITE AND HEMATITIC CLAYS. BECOMES SILTY AT DEPTH. GRADES INTO THE UNDERLYING BEDS.
		SILTY CLAYS AND SILTY SANDS: GRAY, FINE TO VERY FINE GRAINED WITH TRACES OF PYRITE, LIGNITE, MUSCOVITE, MINOR CALCAREOUS AND NON CALCAREOUS CEMENTATION OF SANDS
		LIGNITE: BROWN, SILTY, LAMINATED, INTERBEDDED WITH SILTSTONE
	REKLAW	SILTSTONE: GRAY, LOCALLY SANDY, WITH TRACES OF GLAUCONITE, PYRITE, LIGNITE, INTERBEDDED WITH THIN GRAY CLAY LAYERS
		SAND: CLEAR TO GRAY, MEDIUM TO VERY FINE GRAINED, LOCALLY SILTY, TRACES OF GLAUCONITE, MICA, GYPSUM
	CARRIZO	SAND: CLEAR TO GRAY OR WHITE, FROSTED, FINE TO VERY FINE GRAINED, LOCALLY VERY SILTY, TRACES OF PYRITE AND LIGNITE
		SILTY CLAY: GRAY, DIVIDES PREVIOUSLY DESCRIBED SAND INTO UPPER GRAY AND LOWER WHITE INTERVALS
WILCOX		SILTSTONE: GRAY, ARGILLACEOUS, SOFT, WITH INTERBEDDED THIN STRINGERS OF VERY FINE-GRAINED SAND
		SAND: CLEAR TO GRAY, MEDIUM TO FINE-GRAINED WITH TRACES OF PYRITE, LIGNITE, GLAUCONITE, PETRIFIED WOOD, LOCALLY SLIGHTLY CEMENTED
		LIMESTONE: CREAM TO BUFF, CHALKY, WITH VERY MINOR CALCITE VEINS
		CLAYSTONE: GRAY, SLIGHTLY TO VERY LIGNITIC, WITH TRACES OF CHALK AND MICA

LITHOLOGIC SYMBOLS | CORED INTERVAL | SIDEWALL CORES | SCREENED INTERVAL | ELEVATION X 100 (FEET) | DEPTH X 100 (FEET)

DUAL INDUCTION LATEROLOG

SPONTANEOUS POTENTIAL | RESISTIVITY | CONDUCTIVITY

BOREHOLE COMPENSATED SONIC LOG

GAMMA RAY | SONIC | INTEGRATED TRAVEL TIME

COMPENSATED DENSITY COMPENSATED NEUTRON LOG

GAMMA RAY | CALIPER | BULK DENSITY | NEUTRON POROSITY

ELEVATION X 100 (FEET)

ELEVATION (FT.) GL 374.81 KB N/A TOTAL DEPTH (FT.) 3400 FT
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION 800' FSWL, 1000' FSEL, W. A. McKINNON, SURVEY A-1329 LEON COUNTY, TEXAS
HYDROLOGIC DATA 1. TOTAL DISSOLVED SOLIDS: 870 MG/L
2. MAXIMUM TEMPERATURE: 33.8°C (DURING DRILLING)
3. ELEVATION, BASE OF FRESH WATER: SCREENED IN FRESH WATER

PREPARED J.D.G. DATE 12/22/80
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REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA, GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SETTLEMYRE TOH-2A

JOB NO. MY9700 TABLE NO A-1.2 PAGE 1 OF 4

BEST DOCUMENT AVAILABLE

GROUP: CLAIBORNE

FORMATION: QUEEN CITY / REKLAW / CARRIZO

WILCOX

ELEVATION IN 100 (FEET)

MICRO-LATEROLOG

MICRO-ELECTRICAL LOG

DIFFERENTIAL TEMPERATURE LOG

95° F TEMP 110

-2.00 Δ TEMP 2.00

X - Y CALIPER LOG

DEPTH IN 100 (FEET)

ELEVATION IN 100 (FEET)

COMMENTS

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1556B-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SETTLEMYRE TOH-2A
TABLE NO. A-1.2

JOB NO. MV9700

PAGE 2 OF 4

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GROUP	FORMATION	LITHOLOGY
WILCOX		SILTSTONE: GRAY, ARGILLACEOUS, SOFT, WITH INTERBEDDED THIN STRINGERS OF VERY FINE GRAINED SAND, GRADES INTO SAND: CLEAR TO GRAY, MEDIUM TO FINE-GRAINED, WITH TRACES OF PYRITE, LIGNITE, GLAUCONITE, PETRIFIED WOOD, LOCALLY SLIGHTLY CEMENTED LIMESTONE: CREAM TO BUFF, CHALKY, WITH VERY MINOR CALCITE VEINS CLAYSTONE: GRAY, SLIGHTLY TO VERY LIGNITIC WITH TRACES OF CHALK AND MICA
MIDWAY		SILTSTONE AND CLAYSTONE: GRAY, LOCALLY SANDY, WITH SOME SANDSTONE STRINGERS. TRACES OF GLAUCONITE, MICA, CALCITE, LOCALLY FOSSILIFEROUS DOLOMITE: BROWN, CRYPTO-CRYSTALLINE TO FINELY CRYSTALLINE. TRACES OF QUARTZ AND GLAUCONITE OCCURS AS THIN STRINGERS IN SILTSTONE
NAVARRO	UPPER	MARLSTONE: GRAY, SILTY SOME GLAUCONITE, CHERT, MINOR PYRITE, QUARTZ, MICA, CALCITE LIMESTONE: GRAY, MICROCRYSTALLINE TO FINELY CRYSTALLINE SLIGHTLY ARGILLACEOUS, FOSSILIFEROUS. MARLSTONE: GRAY, SILTY, FOSSILIFEROUS WITH TRACES OF DOLOMITE, CALCITE, SANDSTONE. LIMESTONE: WHITE, VERY FINELY CRYSTALLINE TO SUCROSIC, WITH MINOR DISSEMINATED QUARTZ AND CLAY, LOCALLY FOSSILIFEROUS MARLSTONE: GRAY, SILTY, LOCALLY FOSSILIFEROUS WITH TRACES OF DOLOMITE, CALCITE, SANDSTONE, PYRITE, MICA, QUARTZ AND GLAUCONITE INTERBEDDED WITH: SAND: CLEAR, MEDIUM TO FINE GRAINED QUARTZOSE

LITHOLOGIC SYMBOLS | CORED INTERVAL | SIDEWALL CORES | SCREENED INTERVAL (1933 – 1959)

ELEVATION X 100 (FEET): -14, -16, -18, -20, -22, -24, -26, -28, -30, -32

DEPTH X 100 (FEET): -18, -20, -22, -24, -26, -28

TD

DUAL INDUCTION LATEROLOG

BOREHOLE COMPENSATED SONIC LOG

COMPENSATED DENSITY COMPENSATED NEUTRON LOG

ELEVATION (FT.): GL 374.81 KB N/A TOTAL DEPTH (FT.) 3400 FT
DEPTH MEASUREMENTS ARE FROM GROUND LEVEL EXCEPT AS NOTED
LOCATION: 800' FSWL, 1000' FSEL, W A. McKINNON SURVEY A-1329 LEON COUNTY, TEXAS
NOTES: *1 NACATOCH FORMATION

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1596C-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA, GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-I
DEEP BORING DATA SUMMARY
DOE SETTLEMYRE TOH-2A

JOB NO. MV9700

TABLE NO. A-1.2
PAGE 3 OF 4

[redacted]

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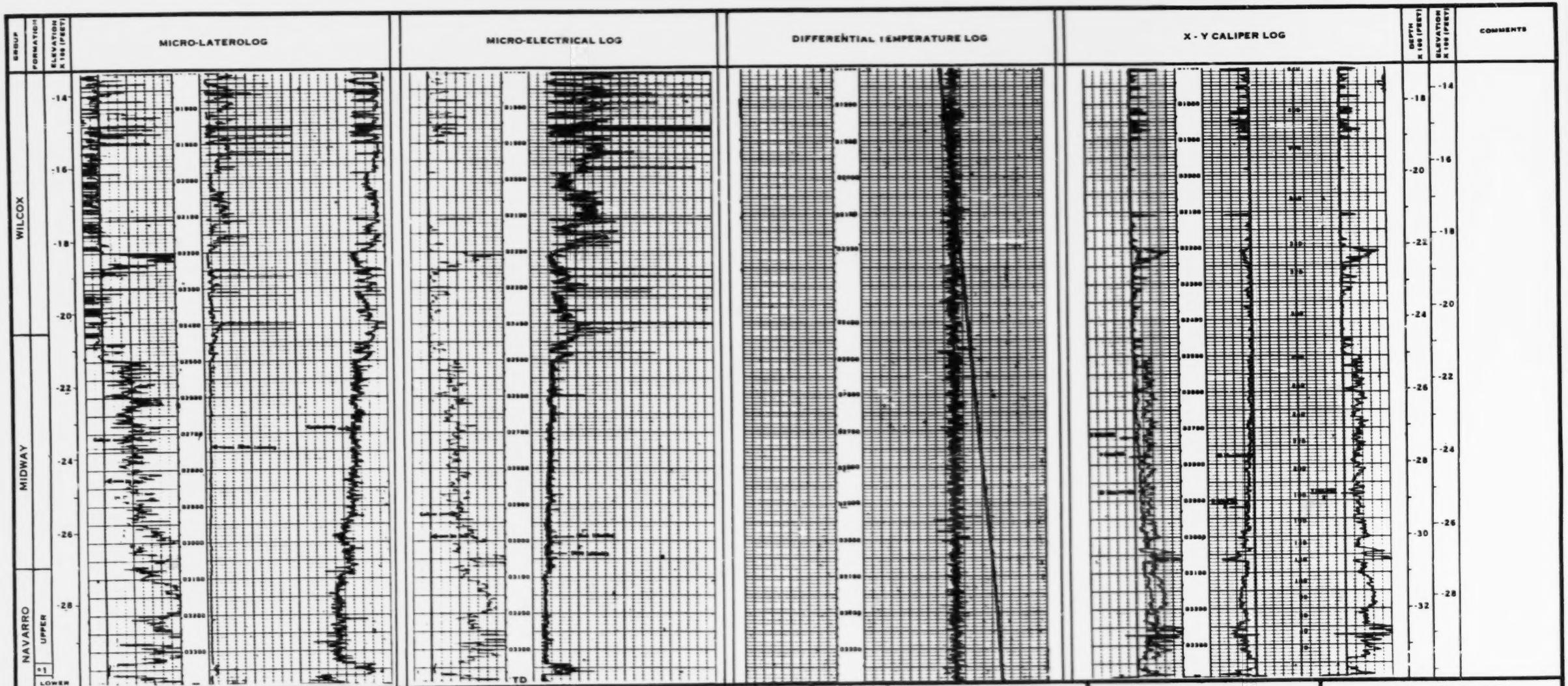

PREPARED JDG DATE 12/22/80
REVISED ____ DATE ____
REVISED ____ DATE ____
APPROVED GMF DATE 12/22/80

T-1596D 1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-1
DEEP BORING DATA SUMMARY
DOE SETTLEMYRE TOH-2A
TABLE NO. A-1.2
JOB NO. MV9700 PAGE 4 OF 4

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EAST TEXAS STUDY AREA

APPENDIX A-2

SHALLOW BORING DATA

Twenty shallow exploratory borings were drilled over Oakwood Dome from May through August, 1979. This drilling program was performed to help interpret the near-surface geologic characteristics in the supradomal area at Oakwood. The depth of the borings ranged from 15 to 136 meters (50 ft to 445 ft); the locations are shown in Figure 7-1. Basic information concerning the Oakwood Dome shallow borings can be found in Table 7-1 (Volume II).

The borings were drilled by subcontractors under the supervision of Law Engineering personnel using mud-rotary boring methods. Relatively undisturbed samples were obtained by using a pitcher barrel which sampled 0.6 meter (2 ft) of material. The sampling interval was determined by Law personnel who also described the samples at the site. Samples were taken at 0.6 and 1.2-meter (2 and 4-ft) intervals to a depth of approximately 30 meters (100 ft). Below 30 meters (100 ft), samples were usually taken at 3 to 9-meter (10 to 30-ft) intervals and, in some cases, at greater intervals.

Following completion of each boring, geophysical logs were run, including natural gamma ray, single-point resistance, and 406-mm (16-in) normal resistance. Well screens were installed in several borings for use as piezometers and observation wells. The screens were 102-mm (4-in)-diameter slotted polyvinyl chloride (PVC) pipe with a solid PVC riser pipe.

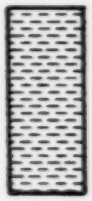
Records of eleven representative shallow borings are presented in Tables A-2.1 through A-2.11 of this appendix section. These logs contain data obtained from the undisturbed samples and geophysical logs. Sample descriptions and stratigraphic correlations were made by LETCo geologists.

EAST TEXAS STUDY AREA

APPENDIX A - 2

SHALLOW BORING DATA

KEY TO SYMBOLS USED ON SHALLOW BORING LOGS



CLAY

SILT

SAND

LIGNITE

UNDISTURBED SAMPLING INTERVAL

WELL SCREEN

[redacted]

12 BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
408.6	0	Gray to White Ferruginous Fine Sand Interbedded with Gray to Brown Clay and White to Red Mottled Silty Clay	QUEEN CITY					Rotary Wash Boring
	10							
	20							
382.6		Gray to Brown Clay with Interbedded Gray to Green Silt and Clayey, Glauconitic Fine Sand	REKLAW					
	30							
	40							
	50							
	60							
	70							
336.6		Gray, Green, and Tan-Brown Fine Sand with Iron Cememted Layer and Occasional Clay Layers						
	80							

LOCATION: R. H. Heatly Survey A-311; 1113' FSWL, 963' FSEL, Freestone County, Tx. COMPLETED: 7-10-79

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1521A-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-101

TABLE NO. A-2.1
PAGE 1 OF 4

BEST DOCUMENT AVAILABLE 3

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
325.6	80	See Preceeding Sheet	REKLAW					
	90	Gray, Green and Brown Fine Sand to Clayey Fine Sand						
	100							
	110							
288.6	120	Green, Clayey Medium to Fine Sand to Fine Sand Interbedded with Clay	CARRIZO					
	130							
	140							
	150							
	160							

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Green, Clayey Medium to Fine Sand to Fine Sand Interbedded with Clay	CARRIZO					
	170							
	180							
221.6								
	190	White, Medium to Fine Sand						
	200					⊠		
	210						▥	
	220							
186.6		Gray to White, Medium to Fine Sand	WILCOX					
	230							
	240							

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	240	See Preceeding Sheet	WILCOX					
158.6	250	Boring Terminated at 250.0 Feet				X		
	260							
	270							
	280							
	290							
	300							
	310							
	320							

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1521D-9

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-101

TABLE NO. A-2.1
PAGE 4 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
359.8	0	Gray to Orange Clayey Medium to Very Fine Sand and Mottled Gray, Brown and Yellow Silty Clay	REKLAW					Rotary Wash Boring
	10							
	20							
	30							
	40							
	50							
306.8		White to Gray, Very Fine Sand and Brown Silt with 14 Inches of Lignite between 78 and 80 Feet	CARRIZO					
	60							
	70							
	80							

LOCATION: Henry Cooper Survey A-677; 1115' FSWL, 1208' FSEL, Freestone County Tx. COMPLETED: 7-18-79

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA

JOB NO. MV9700 T-1522A-7

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME
BORING TOE-102

TABLE NO. A-2.2
PAGE 1 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
277.8	80	See Preceeding Sheet	CARRIZO					
		Gray to White and Tan Clayey Silt to Silt with 2 Inches of Lignite						
	90							
264.8		Very Fine White to Gray Coarse to Very Fine Sand						
	100							
	110							
	120							
	130							
	140							
	150							
	160							

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REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1522B-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-102

TABLE NO. A-2.2
PAGE 2 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Very Fine White to Gray Coarse to Very Fine Sand	CARRIZO					
	170							
	180							
	190							
161.8	200	Bluish Gray to Brown Medium Sand to Interbedded Medium Sand and Clay	WILCOX					
	210							
	220							
	230							
	240							

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1522C-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-102

TABLE NO. A-2.2
PAGE 3 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	240	Bluish Gray to Brown Medium Sand to Interbedded Medium Sand and Clay	WILCOX					
	250							
	260							
	270							
	280							
	290							
59.8	300	Boring Terminated at 300.0 Feet				⊠		
	310							
	320							

PREPARED _____ DATE _____ REVISED _____ DATE _____ REVISED _____ DATE _____ APPROVED _____ DATE _____	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1522D-1	SHALLOW BORING RECORD EAST TEXAS STUDY AREA OAKWOOD DOME BORING TOE-102 TABLE NO. A-2.2 PAGE 4 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
393.8	0	Tan, Gray, and Orange Mottled Medium to Fine Sand	QUEEN CITY					Rotary Wash Boring
	10							
	20							
367.3								
	30	Brown Clay Interbedded with White, Yellow and Brown Sandy Silt						
	40							
343.8	50							
	60	Brown to Dark Brown Clay Interbedded with Gray to Greenish Brown Fine to Very Fine Sandy Silt	REKLAW					
	70							
	80							

LOCATION: T. J. Teal Survey A-774; 1233' FSWL, 688' FNWL, Freestone County, Tx. COMPLETED: 5-17-79

PREPARED _____ DATE _____
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REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV 9700 T-1523A-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-103

TABLE NO. A-2.3
PAGE 1 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Brown to Dark Brown Clay Interbedded with Gray to Greenish Brown Fine to Very Fine Sandy Silt	REKLAW					
	90							
	100							
	110							
274.8	120	Grayish Brown to Dark Green Medium to Fine Sand Interbedded with Brown to Dark Brown Gray Silt and Clay						
	130							
	140							
	150							
	160							

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1523B-T

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-103

TABLE NO. A-2.3
PAGE 2 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
232.8	160	Brown and Gray to White Medium to Fine Sand Interbedded with Gray Silt and Brown Clay	CARRIZO					
	170							
	180							
206.3								
	190	White to Gray Medium to Very Fine Sand Interbedded with Dark Brown Silty Sand						
	200							
	210							
	220							
	230							
	240							

PREPARED _____ DATE _____ REVISED _____ DATE _____ REVISED _____ DATE _____ APPROVED _____ DATE _____	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1523C-1	SHALLOW BORING RECORD EAST TEXAS STUDY AREA OAKWOOD DOME BORING TOE-103 TABLE NO. A-2.3 PAGE 3 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	240							
		White to Gray, Medium to Very Fine Sand Interbedded with Dark Brown Silty Sand	CARRIZO					
	250							
	260					⊠		
124.8	270							
		Gray Fine Silty Sand and Light to Dark Gray Silt and Silty Clay	WILCOX					
	280							
	290							
93.8	300					⊠		
		Boring Terminated at 300.0 Feet						

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94

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ELEV FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
391.8	0	White to Orange Mottled Fine to Medium Sand with Ironstone at Base	REKLAW					Rotary Wash Boring
	10							
376.8		Brown and Tan Silty Clay						
	20							
	30							
	40							
345.8		Brown, Gray and Yellow Medium to Fine Sand with Interbedded Gray to Brown Silty Clay						
	50							
	60							
	70							
	80							

LOCATION: T. J. Teal Survey A-1224; 957' FSWL, 209' FSEL, Leon County, Tx
COMPLETED: 6-22-79

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1524A-4

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-104

TABLE NO. A-2.4
PAGE 1 OF 3

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25

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Brown, Gray and Yellow Medium to Fine Sand with Interbedded Gray to Brown Silty Clay	REKLAW					
301.8	90	Interbedded Brown and Gray Clayey Very Fine Sand to Silt and Clay; Grading to Interbedded Brown and White Fine to Medium Sand and Silt	CARRIZO					
	100							
	110							
	120							
	130							
	140							
	150							
	160							

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Interbedded Brown and Gray Clayey Very Fine Sand to Silt and Clay; Grading to Interbedded Brown and White Fine to Medium Sand and Silt						
	170							
216.8		Tan to White Fine Sand	CARRIZO					
	180							
	190							
191.8	200	Brown, White and Gray Clayey Silt with Minor Clay Beds	WILCOX					
	210							
	220							
	230							
151.8	240	Boring Terminated at 240.0 Feet						

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
329.7	0	Tan to Dark Brown Fine Sand Interbedded with Minor White, Orange, Light Brown and Tan Sandy Clay and Silt	ALLUVIUM					Rotary Wash Boring
310.7	20	Gray, White, Tan, Brown and Yellow Coarse to Fine Sand with Light to Dark Gray and Brown Clay to Silty Clay in Lower 7 Feet.	CARRIZO					
	30							
	40							
	50							
	60							
	70							
	80							

LOCATION: Wilhelm Feller Survey A-274; 1853' FSWL, 742' FNWL, Leon County, Tx.
COMPLETED: 8-16-79

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1525A-4

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-105

TABLE NO. A-2.3
PAGE 1 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Gray, White, Tan, Brown and Yellow Coarse to Fine Sand with Light to Dark Gray and Brown Clay to Silty Clay in Lower 7 Feet.	CARRIZO					
	90							
234.7		Brown to Dark Gray Clay and Silty Clay, with Light Brown Silt and Gray, Very Fine Sand	WILCOX					
	100							
	110							
	120							
	130							
	140							
	150							
170.7	160							

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Bluish-Gray Fine to Medium Sand and Clayey Sand with Minor Amounts of Dark Brown to Bluish-Gray Silty Clay	WILCOX					
	170					X		
	180							
	190							
	200					X		
	210					X		
	220					X		
	230					X		
	240							

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REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1525C-4

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-105

TABLE NO. A-2.5
PAGE 3 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	240	Bluish-Gray, Fine to Medium Sand and Clavey Sand with Minor Amounts of Dark Brown to Bluish-Gray Silty Clay						
	250					X		
	260							
	270							
	280							
	290							
29.7	300					X		
		Boring Terminated at 300.0 Feet						

PREPARED _____ DATE _____ REVISED _____ DATE _____ REVISED _____ DATE _____ APPROVED _____ DATE _____	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1525D-8	SHALLOW BORING RECORD EAST TEXAS STUDY AREA OAKWOOD DOME BORING TOE-105 TABLE NO. A-2.5 PAGE 4 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
378.3	0	Gray, Orange, Tan and Yellow Mottled Fine Sand Interbedded with Brown and Tan Clay	REKLAW					Rotary Wash Boring
	10							
	20							
	30							
	40							
327.3	50	Dark Brown Clay to Silty Clay and Lenses of Gray Fine Sand						
	60							
310.3	70	Tan Medium to Fine Clayey Sand with Minor Brown Clay Layers						
	80							

LOCATION: E. Real Survey A-1093; 598' FNWL, 564' FNEL, Leon County, Tx.
COMPLETED: 6-14-79

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

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MARIETTA GEORGIA

JOB NO. MV9700 T-1526A-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-107

TABLE NO. A-2.6
PAGE 1 OF 3

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Tan Medium to Fine Clayey Sand with Minor Brown Clay Layers	REKLAW					
	90							
279.3	100	White to Gray Fine Sand Interbedded with Brown Clay						
	110							
	120							
256.8		White to Gray Fine Sand Interbedded with Clay and Medium to Fine Sand	CARRIZO					
	130							
	140							
	150							
	160							

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	160	White to Gray Fine Sand Interbedded with Clay and Medium to Fine Sand	CARRIZO					
	170							
	180							
	190							
173.3	200	Boring Terminated at 200.0 Feet						

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1526C-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-107

TABLE NO. A-2.6
PAGE 3 OF 3

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
371.4	0	White, Tan and Yellow Mottled Fine Sand Interbedded with Silt and Grayish Brown Silty Clay	QUEEN CITY					Rotary Wash Boring
	10							
356.4		Light to Dark Brown to Dark Gray Clay						
	20							
348.4		White, Gray and Brown Medium to Fine Sand with Minor Interbedded Brown Clay						
	30							
	40							
	50							
	60							
	70							
295.4		Gray to Tan Medium to Fine Sand						
	80							

LOCATION: A. McKinnon Survey A-1332; 1010' FNWL, 792' FNEL, Leon County, Tx.
COMPLETED: 6-11-79

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1527A-D

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-108

TABLE NO. A-2.7
PAGE 1 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Gray to Tan Medium to Fine Sand	QUEEN CITY					
	90							
	100							
269.4		Interbedded Grayish Brown Silty Clay and Lenses of Gray Clayey Sand	REKLAW					
	110							
	120							
	130							
	140							
	150							
	160							

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

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MARIETTA GEORGIA

JOB NO. MV9700 T-1527B-7

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-108

TABLE NO. A-2.7
PAGE 2 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	160	Interbedded Grayish Brown Silty Clay and Lenses of Gray Clayey Sand	REKLAW					
200.4	170	Green to White Medium to Fine Sand						
	180							
	190							
	200							
	210							
	220							
143.4	230	Medium to Coarse Sand with Reddish Orange Ironstone and Minor Gray-Brown to Gray Clay	CARRIZO					
	240							

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV 9700 T-1527C-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-108

TABLE NO. A-2.7
PAGE 3 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	240	Medium to Coarse Sand with Reddish Orange Ironstone and Minor Gray-Brown to Gray Clay	CARRIZO					
	250							
	260							
	270							
	280							
	290							
	300							
	310							
51.4	320	Boring Terminated at 320.0 Feet						

PREPARED _____ DATE _____ REVISED _____ DATE _____ REVISED _____ DATE _____ APPROVED _____ DATE _____	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1527D-1	SHALLOW BORING RECORD EAST TEXAS STUDY AREA OAKWOOD DOME BORING TOE-108 TABLE NO. A-2.7 PAGE 4 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
335.8	0	White, Gray, Yellow and Red Mottled Interbedded Micaceous, Very Fine Sand and Brown Clayey Silt	TERRACE DEPOSITS (QUATERNARY)					Rotary Wash Boring
	10							
315.8	20	Brown to Light Tan Fine Sand Interbedded with Lenses of Brown Clay						
	30							
	40							
285.8	50	Boring Terminated at 50.0 Feet						
	60							
	70							
	80							

LOCATION: Wilhelm Feller Survey A-274; 1680' FSWL, 1627' FSEL, Leon County, Tx.
COMPLETED: 8-12-79

PREPARED _____ DATE _____
REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1528-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-112

TABLE NO. A-2.8
PAGE 1 OF 1

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
313.7	0	Gray, Yellow Brown, Red and Tan Medium to Fine Sand Interbedded with Purplish Brown and Gray Mottled Silty Clay with Some Lignite	QUEEN CITY					Rotary Wash Boring
	10							
	20							
	30							
	40							
267.2								
	50	Dark Brown to Gray Silty Clay Interbedded with Dark Green to Gray Very Fine Sand						
	60							
	70							
	80							

LOCATION: J. R. Brown Survey A-82; 1330' FSWL, 727' FNWL, Leon County, Tx.
COMPLETED: 8-2-79

PREPARED _____ DATE _____
REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1529A-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-115

TABLE NO. A-2.9
PAGE 1 OF 6

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	80	Dark Brown to Gray Silty Clay Interbedded with Dark Green to Gray Very Fine Sand	QUEEN CITY					
	90							
	100							
	110							
	120							
189.7		Dark Brown to Light Brown and Gray, Medium to Fine Sand with Minor Gray to Dark-Brown Clay Layers						
	130							
	140							
	150							
	160							

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REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1529B-[illegible]

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-115

TABLE NO. A-2.9
PAGE 2 OF 6

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	160	Dark Brown to Light Brown and Gray Medium to Fine Sand with Minor Gray to Dark Brown Clay Layers	QUEEN CITY					
	170					X		
136.7								
	180	Dark Brown to Dark Green Clay and Light Brown Silty Clay Interbedded with Brown, Light Gray, and Dark Green Very Fine Sandy Silt Lenses	REKLAW			X		
	190					X		
	200					X		
	210					X		
	220					X		
	230					X		
	240					X		

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REVISED _____ DATE _____
REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1529C-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-115

TABLE NO. A-2.9
PAGE 3 OF 6

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	240	Dark Brown to Dark Green Clay and Light Brown Silty Clay Interbedded with Brown, Light Gray, and Dark Green Very Fine Sandy Silt Lenses	RECENT					
	250							
	260							
49.7								
		Dark Green, Brown, Gray, and White, Medium to Fine Sand with Minor Dark Brown Clay and Light Brown Silt						
	270							
	280							
	290							
	300							
	310							
	320							

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BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	320	Dark Green, Brown, Gray, and White, Medium to Fine Sand with Minor Dark Brown Clay and Light Brown Silt	REKLAW					
	330							
	340					⊠		
	350							
-44.3								
	360	White, Tan, and Brown, Coarse to Fine Sand with Traces of Dark Brown Silty Clay	CARRIZO			⊠		
	370							
	380							
	390							
	400					⊠		

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1529E-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-115

TABLE NO. A-2.9
PAGE 5 OF 6

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	400	White, Tan, and Brown, Coarse to Fine Sand with Traces of Dark Brown Silty Clay	CARRIZO					
	410							
	420							
	430							
	440							
-129.3		Boring Terminated at 443.0 Feet						

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BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
365.1	0	Gray to Grayish Brown Fine to Very Fine Sand Interbedded with Gray, Yellow and Red Mottled Silty Clay	TERRACE			X		Rotary Wash Boring
355.1	10	Brown Clay Interbedded with Gray Silty Clay				X		
347.1	20	Interbedded Fine to Medium Sand and Brown Clay and Gray Clayey Silt				X		
	30					X		
	40					X		
319.1		Boring Terminated at 46.0 Feet						
	50							
	60							
	70							
	80							

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LOCATION: Wilhelm Feller Survey; A-274 1332' FSEL, 1931 FNEL, Leon County, Tx.
COMPLETED: 8-9-79

PREPARED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

JOB NO. MV9700 T-1530-4

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-117

TABLE NO. A-2.10
PAGE 1 OF 1

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
439.0	0	Tan-Brown, Gray, and Orange-Brown Mottled Clayey Fine Sand and Orange-Brown to Orange Sandy Clay	QUEEN CITY					Rotary Wash Boring
429.0	10	Gray and Red Mottled Silty Clay to Purplish Brown Clay						
419.0	20	Interbedded Brown to Tan-Brown Silty Clay and Tan to White Very Fine Sand Lenses						
	30							
405.0		Grayish White, Tan White and Orange-Brown Fine to Very Fine Sand Interbedded with Brown and Tan Clay						
	40							
	50							
	60							
	70							
	80							

LOCATION: H. D. Cumbie Survey; A-678 1095' FNWL, 613' FNEL, Freestone Co.,Tx.
COMPLETED: 8-24-79

PREPARED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
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JOB NO. MV9700 T-1531A-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-121

TABLE NO. A-2.11
PAGE 1 OF 4

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ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	80	Grayish White, Tan-White and Orange-Brown Fine to Very Fine Sand Interbedded with Brown and Tan Clay	QUEEN CITY					
	90							
	100							
	110							
	120							
316.0		Dark Gray to Dark Brown to Black Lignitic Clayey Fine to Very Fine Sand Interbedded with Dark Gray to Black Clay						
	130							
	140							
	150							
	160							

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REVISED _____ DATE _____
REVISED _____ DATE _____
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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
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JOB NO. MV9700 T-1531B-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-121

TABLE NO. A-2.11
PAGE 2 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	N VALUE	UN-DISTURBED SAMPLES	SCREENED INTERVAL	REMARKS:
	160	Dark Gray to Dark Brown to Black Lignitic Clayey Fine to Very Fine Sand Interbedded with Dark Gray to Black Clay	QUEEN CITY			X		
	170					X		
						X		
259.0	180					X		
		Bluish Gray Lignitic Fine to Medium Fine Sand				X		
	190					X		
245.0						X		
		Interbedded Bluish Gray, Gray, Green and Brown Fine to Very Fine Sand and Dark Brown Clay Lenses	REKLAW			X		
	200					X		
						X		
	210							
	220					X		
	230					X		
	240					X		

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REVISED _____ DATE _____
APPROVED _____ DATE _____

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
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JOB NO. MV9700 T-1531C-1

SHALLOW BORING RECORD
EAST TEXAS STUDY AREA
OAKWOOD DOME

BORING TOE-121

TABLE NO. A-2.11
PAGE 3 OF 4

BEST DOCUMENT AVAILABLE

ELEV. FT. MSL	DEPTH IN FEET	STRATA DESCRIPTION	FORMATION	LITHOLOGY	R VALUE	UNDISTURBED SAMPLES	SCREENED INTERVAL	REMARKS
	240	Interbedded Bluish Gray, Gray, Green and Brown Fine to Very Fine Sand and Dark Brown Clay Lenses	REKLAW					
	250					X		
	260					X		
171.0								
	270	Interbedded Gray to Brown Silty Very Fine Sand and Dark Brown Clay						
	280							
	290							
139.0	300					X		
		Boring Terminated at 300.0 Feet						
	310							
	320							

PREPARED _____ DATE _____ REVISED _____ DATE _____ REVISED _____ DATE _____ APPROVED _____ DATE _____	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA JOB NO. MV9700 T-1531D-1	SHALLOW BORING RECORD EAST TEXAS STUDY AREA OAKWOOD DOME BORING TOE-121 TABLE NO. A-2.11 PAGE 4 OF 4

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EAST TEXAS STUDY AREA

APPENDIX A-3

NEAR-DOME WELL DATA

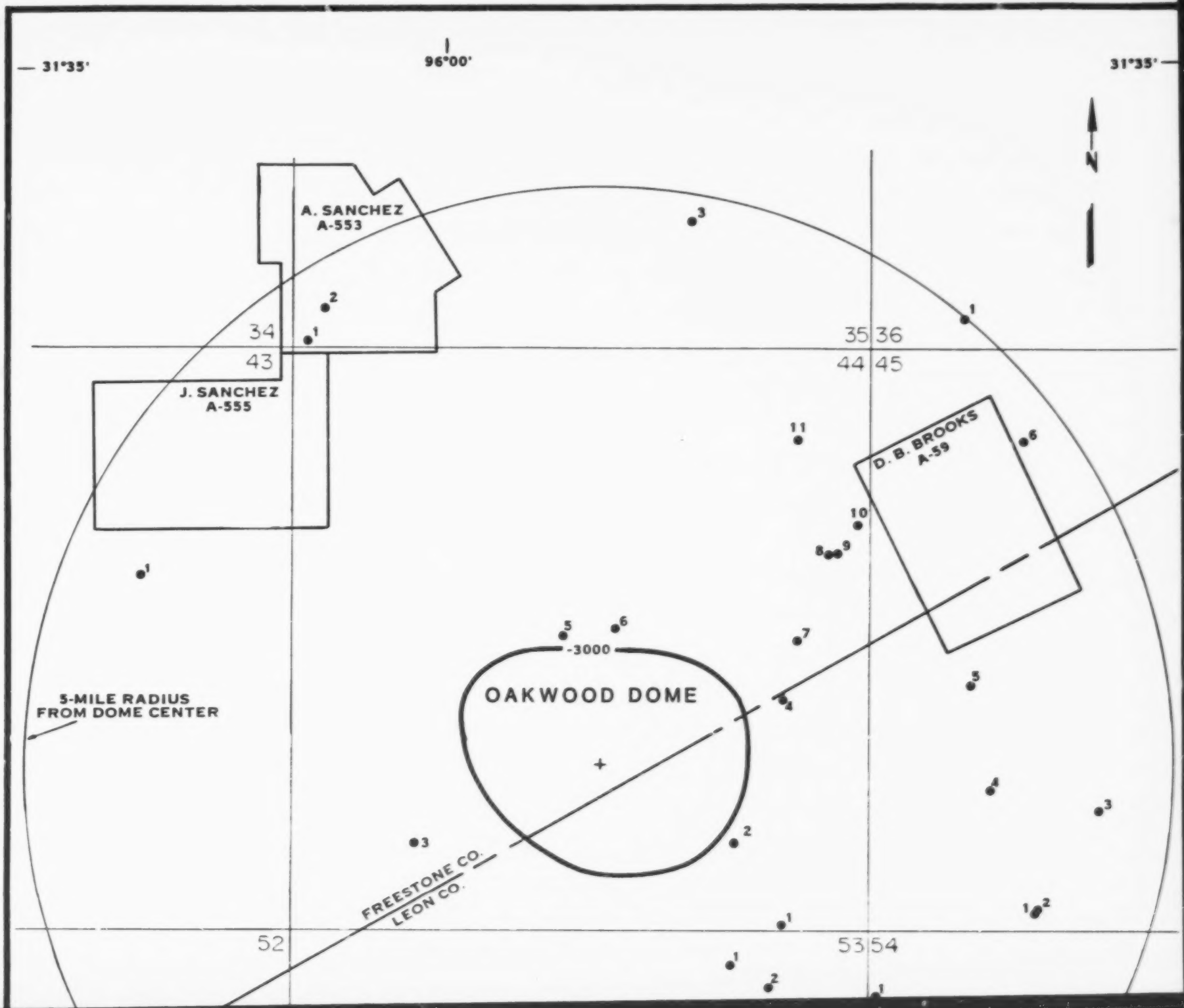
A tabulation of the hydrocarbon wells drilled within a 5-mile radius of Oakwood and Keechi Domes is presented in this appendix section. The locations of the wells are presented in Figures A-3.1 and A-3.2. The wells and exploratory borings drilled within the surface projection of the -914-meter (-3000-ft) MSL salt dome contour of both Oakwood and Keechi Domes are presented in Tables 7-1 and 7-2, and their locations are shown in Figures 7-1 and 7-11; therefore, they have not been included in this appendix.

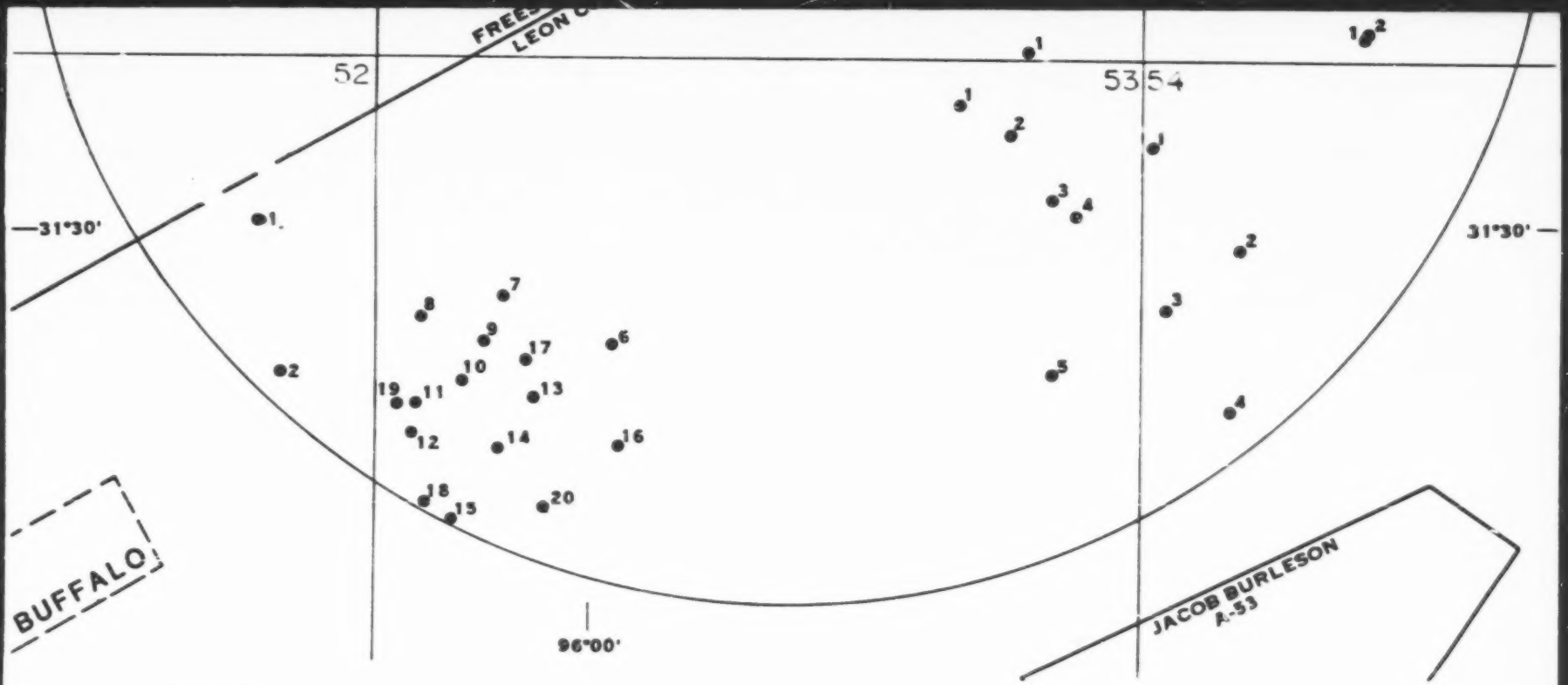
A 13-km^2 (5-mi^2) grid was plotted on the Study Area Well Location Map (Figure A-4.1) to facilitate the identification of the wells. The grid blocks were numbered consecutively from west to east. Within each block the wells were numbered sequentially. Thus, the first two digits of the well number shown in Tables A-3.1 and A-3.2 correspond to the block number, while the last digit(s) indicate(s) the well identification number within each block. This numbering system applies to Figures A-3.1 and A-3.2.

The June 1, 1980 revision of Kelly Map Company's Palestine Quadrangle was used to determine well locations. The well data shown in Tables A-3.1 and A-3.2, including total depth, bottom-hole formations, and logged intervals, were obtained from Tobin

maps, scout tickets, East Texas Well Log Service catalogs, Texas Railroad Commission field maps, and well logs from LETCo's files. In addition, existing isochores and structure contour maps, as well as seismic data, were utilized to determine the bottom-hole formation when not otherwise available.

BEST DOCUMENT AVAILABLE





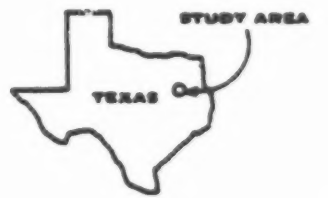
53A

LEGEND

- TOWN
- COUNTY LINE
- SALT DOME CONTOUR ELEVATION FEET MSL
- HYDROCARBON WELL
- BROOKS A-59 — SURVEY NAME AND ABSTRACT NUMBER
- 35/36 over 44/45 — STUDY AREA GRID SHOWN IN FIGURE A-4.

WELLS WITHIN THE -3000 FOOT MSL SALT CONTOUR ARE SHOWN IN FIGURE 7-1 IN VOLUME II.

A TABULATION OF THE WELLS IS PRESENT IN TABLE A-3.1.



1 0 1 MILES
1.5 1 0.5 0 1.5 KILOMETERS

KELLY MAP, PALESTINE QUADRANGLE, 8-1-69

PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GMF	DATE	12/22/80

T-1563-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-3
LOCATION MAP OF HYDROCARBON WELLS WITHIN 5-MILE RADIUS OF OAKWOOD DOME

JOB NO. MV9700 FIGURE A-3.1

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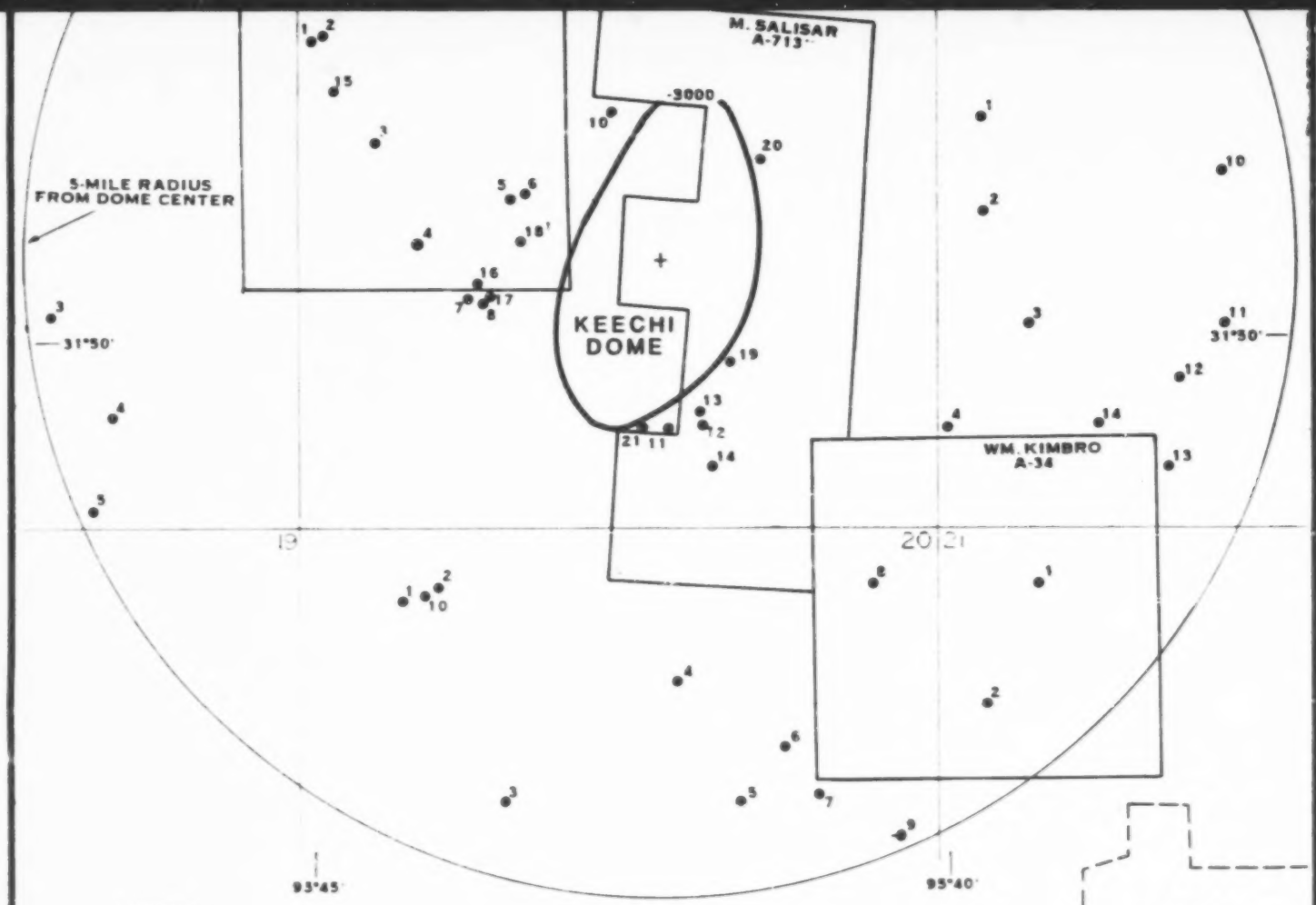

PREPARED J.D.G.	DATE 12/22/80	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES
REVISED	DATE	
REVISED	DATE	
APPROVED	DATE	LAW ENGINEERING TESTING COMPANY MARIETTA, GEORGIA
T-1564-1		

EAST TEXAS STUDY AREA
APPENDIX A-3
LOCATION MAP OF HYDROCARBON WELLS WITHIN 5-MILE RADIUS OF KEECHI DOME

JOB NO. MV9700 FIGURE A-3

FIGURE A-32

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EAST TEXAS STUDY AREA

APPENDIX A-3

TABLE A-3.1 (Page 1 of 2)

HYDROCARBON WELLS WITHIN A 5-MILE RADIUS OF OAKWOOD DOME*

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
35-1	KILLAM - Yeager #1	5425	Woodbine	445-5400
35-2	KILLAM - Killam #1	5325	Woodbine	403-5325
35-3	HUMBLE - Greer #2C	9889	Travis Peak	240-9889
36-1	HARRIS-FENDER - Greer #1	5392	Woodbine	No Data
43-1	KILLAM - Hartley #1	5645	Woodbine	441-5640
44-1	KEECHI - McKennon #1	4016	Pecan Gap	No Data
44-2	WYNNE - Brown #1	6092	Woodbine	150-6092
44-3	ROBERTS ET AL - Reed et al #1	6475	Woodbine	212-6470
44-4	HANSBRO - Richardson #1	6120	Woodbine	100-6120
44-5	ROXANA - Thiele #1	3955	Taylor	No Data
44-6	MCBEE - Settlemyre #1	6351	Woodbine	720-6358
44-7	HOLT-YOUNG - Chambers #1	6195	Woodbine	No Data
44-8	CREIGHTON - Holley #1	5395	Eagle Ford	No Data
44-9	MCBEE - Holley #1	5870	Woodbine	204-5870
44-10	BASIN - Holley #1	5640	Woodbine	200-5650
44-11	KEECHI - Pickens #1	3803	Pecan Gap	No Data
45-1	HARRISON - Leone Plant #1	2353	Wilcox	300-2535
45-2	P.G. LAKE - Leone Plant #1	5929	Woodbine	454-5925
45-3	CARTER-GRAGG - Campbell #1	5818	Woodbine	716-5818
45-4	TEXACO - Prasifka #1	6000	Woodbine	1890-5999
45-5	MANLEY - Campbell #1	5914	Woodbine	212-5902
45-6	STEPHENS - Pope #1	6116	Buda	236-6115
52-1	MCFARLANE - Henson #1	6250	Woodbine	400-6250
52-2	JORDAN - Van Winkle #1	6208	Woodbine	220-6240
53-1	KATZ - Keep #1	6050	Woodbine	700-6050
53-2	TEXACO - Keep #1	10707	Travis Peak	170-10701
53-3	STEWART O. - Keil #1	6100	Woodbine	750-6100
53-4	MCCORMICK-HAMILL - Recknor #1	16500	Bossier	0-16500
53-5	ROWE - Keil #1	5910	Woodbine	165-5903
53-6	ROBERTS ET AL - Cadennead et al #1	5731	Eagle Ford	210-5731

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EAST TEXAS STUDY AREA

APPENDIX A-3

TABLE A-3.1 (Page 2 of 2)

HYDROCARBON WELLS WITHIN A 5-MILE RADIUS OF OAKWOOD DOME*

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
53-7	MARINO - Jowers #1	5937	Woodbine	No Data
53-8	MARINO - Harrington #1	5850	Eagle Ford	222-5840
53-9	MARINO - W.P. Jowers #1A	5784	Eagle Ford	No Data
53-10	ROBERTS-HAMMACK - Chastain #1	5875	Eagle Ford	220-5870
53-11	MARINO - Tolbert #1	5850	Eagle Ford	No Data
53-12	MARINO - Cadenhead #2	6152	Eagle Ford	No Data
53-13	ROBERTS-HAMMACK - Jeter #1A	5798	Eagle Ford	205-5786
53-14	ROBERTS ET AL - Jeter #1A	5798	Eagle Ford	200-5798
53-15	ROBERTS-HAMMACK - Allright #1	5800	Eagle Ford	200-5810
53-16	ROBERTS ET AL - Cadennead et al #1	5810	Eagle Ford	180-5805
53-17	MARINO - Jowers S1A	5784	Eagle Ford	No Data
53-18	MARINO - Overcash #1	5812	Eagle Ford	No Data
53-19	MARINO - Cadennead #3	5838	Eagle Ford	No Data
53-20	ROBERTS ET AL - Oliver et al #1	5840	Eagle Ford	No Data

*Well Locations shown in Figure A-3.1

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EAST TEXAS STUDY AREA

APPENDIX A-3

TABLE A-3.2 (Page 1 of 4)

HYDROCARBON WELLS WITHIN A 5-MILE RADIUS OF KEECHI DOME*

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
3-1	MCCORMICK ET AL - Jenkins #1	10506	Travis Peak	1823-10503
4-1	LA GORCE - Royall #1	5400	Woodbine	342-5395
4-2	BARNHART - Royal N. B. #1	5462	Woodbine	No Data
4-3	MAGNOLIA - Fitzgerald #1	5220	Woodbine	222-5217
4-4	HUMBLE - J. Fitzgerald #1	4806	Woodbine	177-4800
4-5	MORGAN BROS. - Concord #9	4794	Woodbine	180-4790
4-6	HUMBLE - Sampson #4	4665	Woodbine	170-4660
4-7	MAGNOLIA - Campbell #1	4669	Woodbine	599-4574
4-8	MAGNOLIA - Horwitz #1	6327	Buda	150-5044
4-9	HUMBLE - Horwitz #1	12303	Pettet	100-12300
4-10	HUMBLE - Sampson 5-B	4812	Woodbine	165-4806
4-11	HUMBLE - Sampson #3-B	4755	Buda	175-4746
4-12	HUMBLE - Sampson #4-B	4745	Buda	165-4727
4-13	HUMBLE - Sampson #2-B	4680	Woodbine	167-4662
4-14	HUMBLE - Sampson #1-B	4658	Woodbine	173-4652
4-15	HUMBLE - Sampson #1-C	4830	Woodbine	170-4825
4-16	HUMBLE - Sampson #7	4835	Buda	168-4828
4-17	HUMBLE - Sampson #5	4723	Woodbine	180-4718
4-18	HUMBLE - Sampson #3	4720	Woodbine	165-4720
4-19	HUMBLE - Sampson #6	4687	Buda	150-4682
4-20	HUMBLE - R. Fitzgerald #1	4880	Buda	No Data
4-21	MEADOWS - J. Kelly #3	5060	Buda	120-5050
4-22	HUMBLE - Campbell #3	4480	Woodbine	168-4445
4-23	HUMBLE - Campbell #1	4642	Woodbine	178-4637
4-24	MEADOWS - Concord #1	4558	Woodbine	150-4550
4-25	MEADOWS - Campbell #1	4540	Woodbine	150-4535
4-26	HUGHEY & CONE - Campbell #1	--	No Data	--
4-27	HUMBLE - Sampson #1	4620	Woodbine	165-4614

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EAST TEXAS STUDY AREA

APPENDIX A-3

TABLE A-3.2 (Page 2 of 4)

HYDROCARBON WELLS WITHIN A 5-MILE RADIUS OF KEECHI DOME*

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
4-28	HUMBLE - Rogers #1	4720	Woodbine	170-4715
4-29	MAGNOLIA - Kelly #2	--	No Data	--
4-30	MAGNOLIA - Kelly #1	4786	Buda	221-4786
4-31	HUMBLE - Campbell #2	4610	Woodbine	173-4611
4-32	HUMBLE - Sampson #2	4550	Buda	177-4547
5-1	EXXON - Mound Praire G.U.1 #2	11090	Travis Peak	2350-11090
5-2	unmarked **	--	No Data	--
11-1	PATRICK - Owens #1	10438	Travis Peak	2030-10432
11-2	HUMBLE - Rooney #1	10510	Travis Peak	1643-10496
11-3	HUNT - Fort #1	10650	Travis Peak	1820-10645
11-4	MESSENGER - Davey 1A	5120	Woodbine	300-5100
11-5	EPPERSON - Shelton #1	5868	Buda	228-5867
12-1	ROESER - Brooks #1	4175	Woodbine	No Data
12-2	ROESER - Brooks #2	5230	Buda	No Data
12-3	ROESER - Via #1	4335	Woodbine	No Data
12-4	COSDEN - Douglas #1	4832	Woodbine	No Data
12-5	BROYLES - Willhite #2	4605	Buda	250-4616
12-6	BROYLES - Willhite #1	4068	Buda	250-4050
12-7	TEXACO - O'Flynn #1	5863	Buda	100-5847
12-8	GEISLEMAN - O'Flynn	4270	Eagle Ford	230-4262
12-10	LA RUE - Jernigan #1	3711	Austin	217-3708
12-11	TEXACO - Greenwood #2	4032	Woodbine	563-3926
12-12	MCCORMICK ET AL - Jones #2	3859	Woodbine	No Data
12-13	MCCORMICK ET AL - Jones #1	3927	Ector	No Data
12-14	TEXACO - Greenwood #1A	2185	Pecan Gap	60-1005
12-15	CAPE OPER - Vance #1	5250	Woodbine	200-5250
12-16	COSDEN - Douglas #2	3861	Austin	No Data
12-17	COSDEN - Adams #1	4005	Woodbine	No Data

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EAST TEXAS STUDY AREA

APPENDIX A-3

TABLE A-3-2 (Page 3 of 4)

HYDROCARBON WELLS WITHIN A 5-MILE RADIUS OF KEECHI DOME*

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
12-18	unmarked **	--	No Data	--
12-19	BROYLES-McFARLAND - Butler #1	3160	No Data	215-3128
12-20	LaRUE-JACKSON - Scott #1	3693	No Data	216-3690
12-21	PRODUCERS - Barrett and Greenwood #5	3035	No Data	No Data
13-1	STORM - Broyles #1	5650	Woodbine	300-5658
13-2	FROST - Walker #1	5705	Woodbine	450-5700
13-3	WESTLAND - Mitchell #1	6495	Buda	No Data
13-4	UNION OF TEXAS - Shroyer #1	5750	Woodbine	No Data
13-5	BYRD - Dosser #1	5567	Woodbine	532-5560
13-6	FAIR - Quick #1	11307	Travis Peak	2160-11300
13-7	HUMBLE - Mound Praire G.U. 2 #1	11007	Travis Peak	2335-11004
13-8	BASIN OPER - Royall #1	11146	Travis Peak	No Data
13-9	DOUGLAS-GRELLING - Royal N.B. #1	5454	Woodbine	238-5453
13-10	PERRYMAN - Royal Nat. Bank #1	5540	Woodbine	120-5540
13-11	DANIEL - Handorf #1	5518	Woodbine	212-5514
13-12	BASIN OPER (HUGHEY ET. AL.) - Gardner #1	10872	Travis Peak	1972-10858
13-13	KOHLBUSH - Gardner #1	5716	Woodbine	216-5715
13-14	HALBOUTY - Gardner #1	5790	Woodbine	222-5793
20-1	FARISH III - Waites #1	2030	Wilcox	200-2030
20-2	YEAKLEY - Waites #1A	1852	Wilcox	No Data
20-3	OLSAN - Jordan #1	5500	Woodbine	250-5499
20-4	UNION - Rairigh #1	5605	Woodbine	818-5606
20-5	PURE - City of Palestine #1	11886	Travis Peak	2160-11886
20-6	MILLER - Coble #1	5815	Woodbine	530-5819
20-7	MCFARLANE - Johnson #1	6320	Woodbine	No Data
20-8	BYARS - Pessoney #1	5666	Woodbine	146-5666
20-9	PYLE - Henderson #1	5638	Eagle Ford	700-5637

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EAST TEXAS STUDY AREA

APPENDIX A-3

TABLE A-3.2 (Page 4 of 4)

HYDROCARBON WELLS WITHIN A 5-MILE RADIUS OF KEECHI DOME*

LETCO Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
20-10	YEAKLEY - Waites #1	1805	Wilcox	No Data
21-1	HUGGINS - Huggins #1	5820	Woodbine	490-5821
21-2	TIPTON - Chotiner #1	5807	Woodbine	106-5807

* Well locations shown in Figure A-3.2
** Well drilled during early 1900's

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EAST TEXAS STUDY AREA

APPENDIX A-4

STUDY AREA WELL DATA

A tabulation of hydrocarbon wells, drilled within the limits of the study area and utilized in the Area Characterization studies, is presented in this appendix section. The locations of the wells used in the analyses are presented in Figure A-4.1. The wells and exploratory borings drilled within the surface projection of the -914-meter (-3000-ft) MSL salt dome contour of the candidate domes (Oakwood, Keechi and Palestine) are listed in Tables 7-1, 7-2, and 7-3, and locations are shown in Figures 7-1, 7-11, and 7-22 and are not included in this appendix.

A 13-km^2 (5-mi^2) grid was established on the Study Area Well Location Map (Figure A-4.1) to facilitate identification of the wells. The grid blocks were numbered consecutively from west to east. Within each block the wells were numbered sequentially. Thus, the first two digits of the well number shown in Table A-4.1 correspond to the block numbers, while the last digit(s) indicate(s) the well identification number within each block.

The Kelly Map Company's Palestine quadrangle (June 1, 1980 edition) was used for well location. Well data, including total depth, bottom-hole formation, and logged intervals, were obtained from Tobin lease maps, well-completion reports, scout tickets, East Texas Well Log Service catalogs, Texas Railroad Commission

field maps, and geophysical well logs. A portion of this information is available in LETCo files and the remainder was provided by the Texas Bureau of Economic Geology (BEG).

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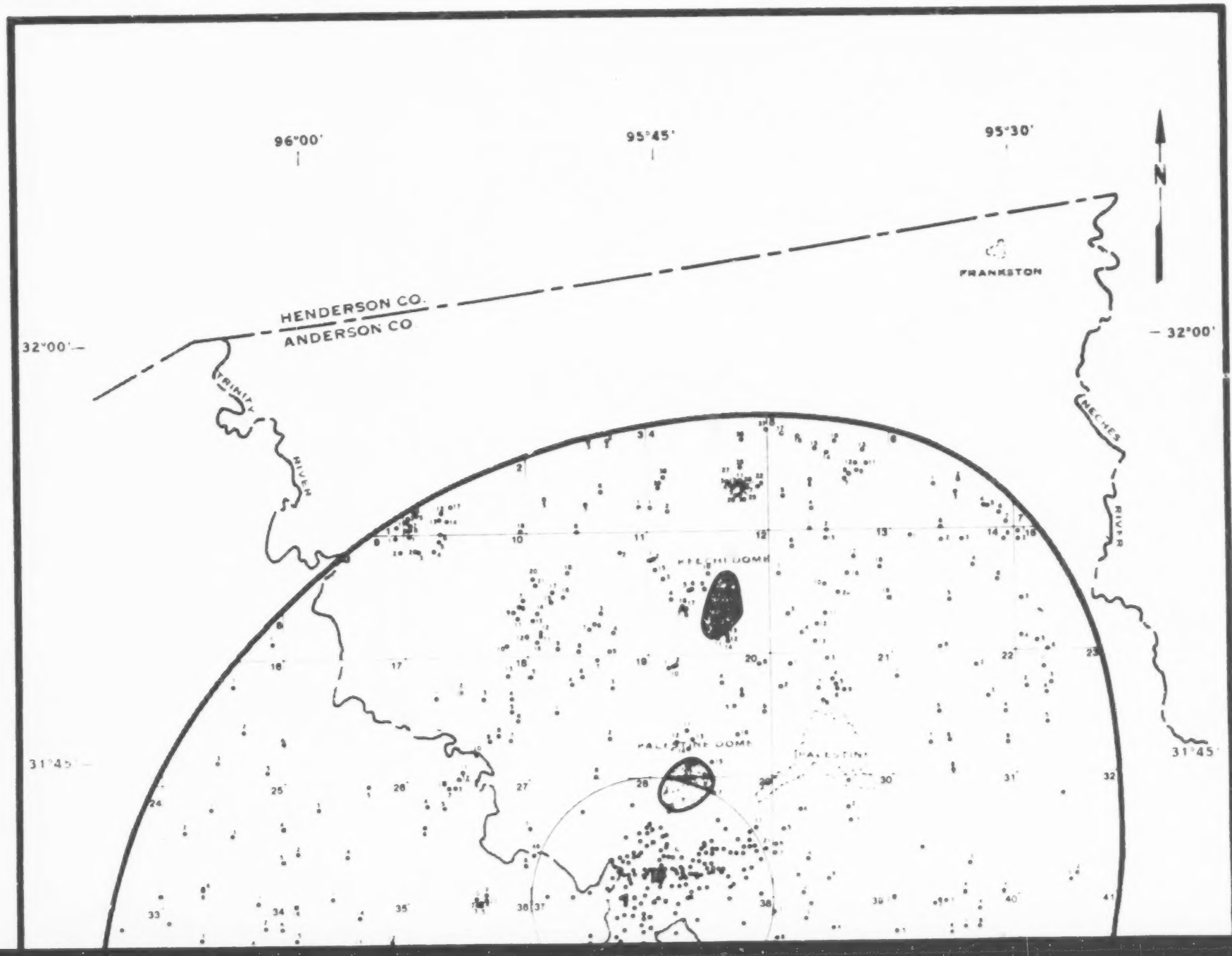

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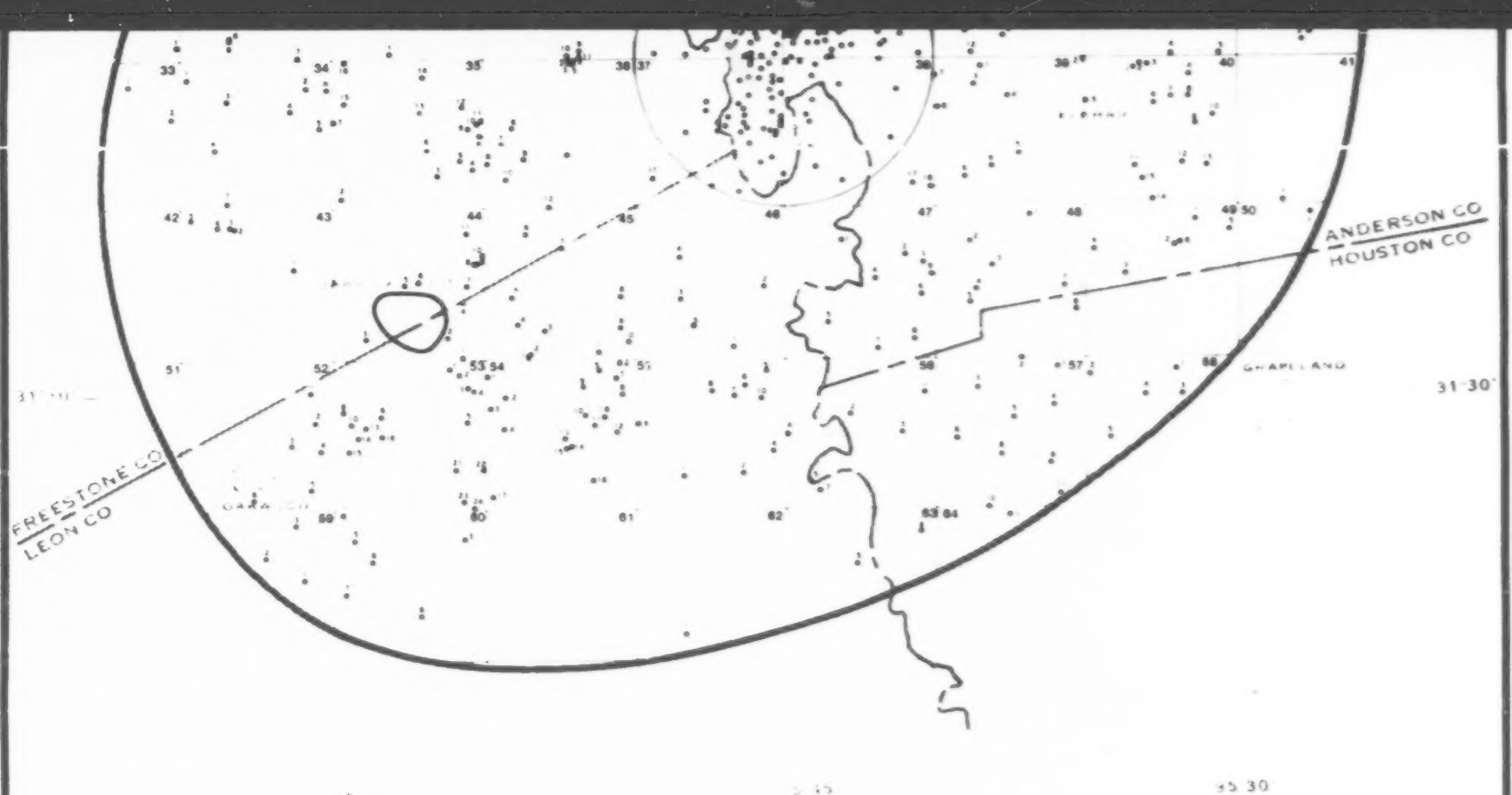

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APPROVED		DATE

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

EAST TEXAS STUDY AREA

APPENDIX A-4

LOCATION MAP OF WELLS USED IN ANALYSES

JOB NO MV8700

FIGURE A-4.1
FIGURE 1 OF 3

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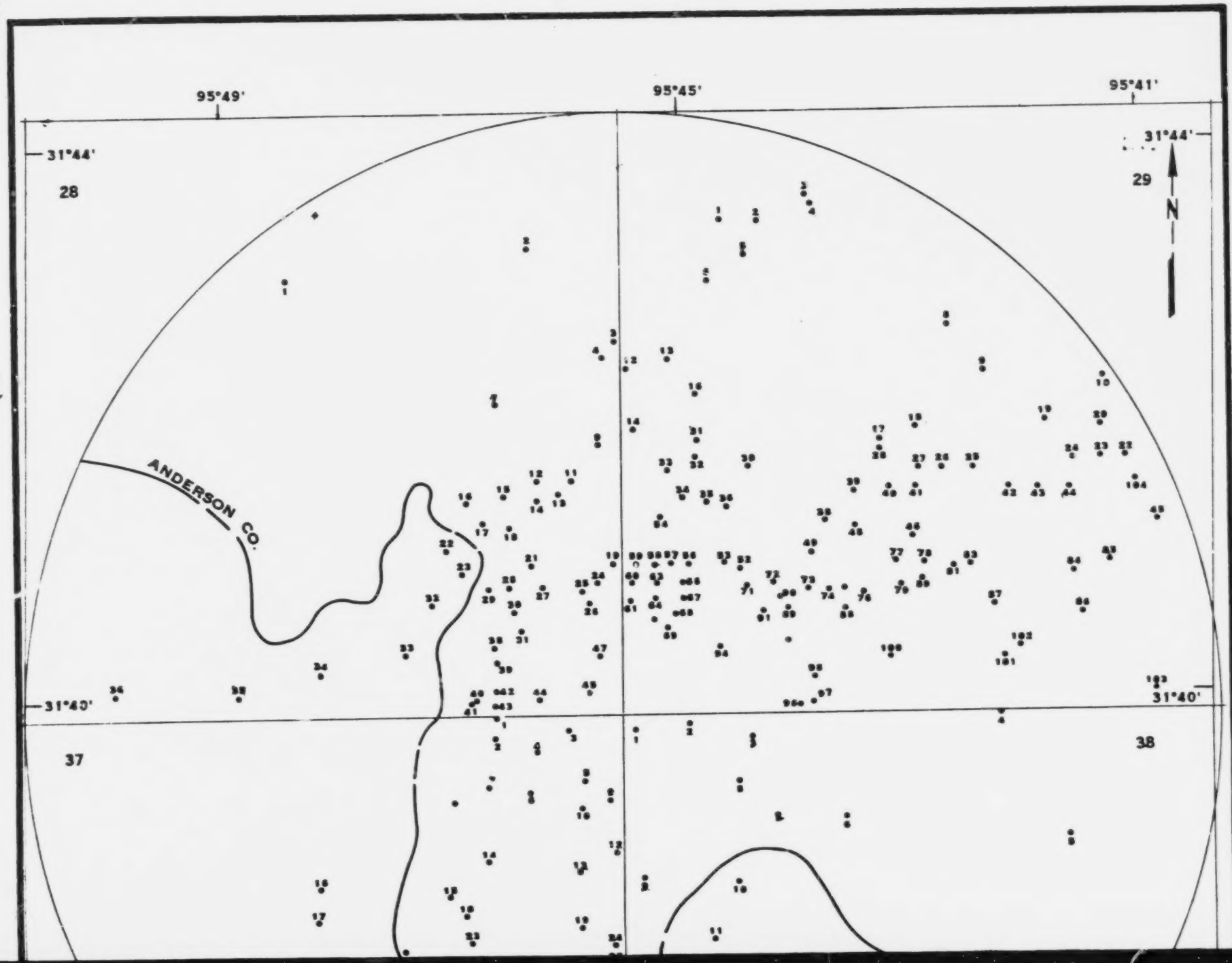

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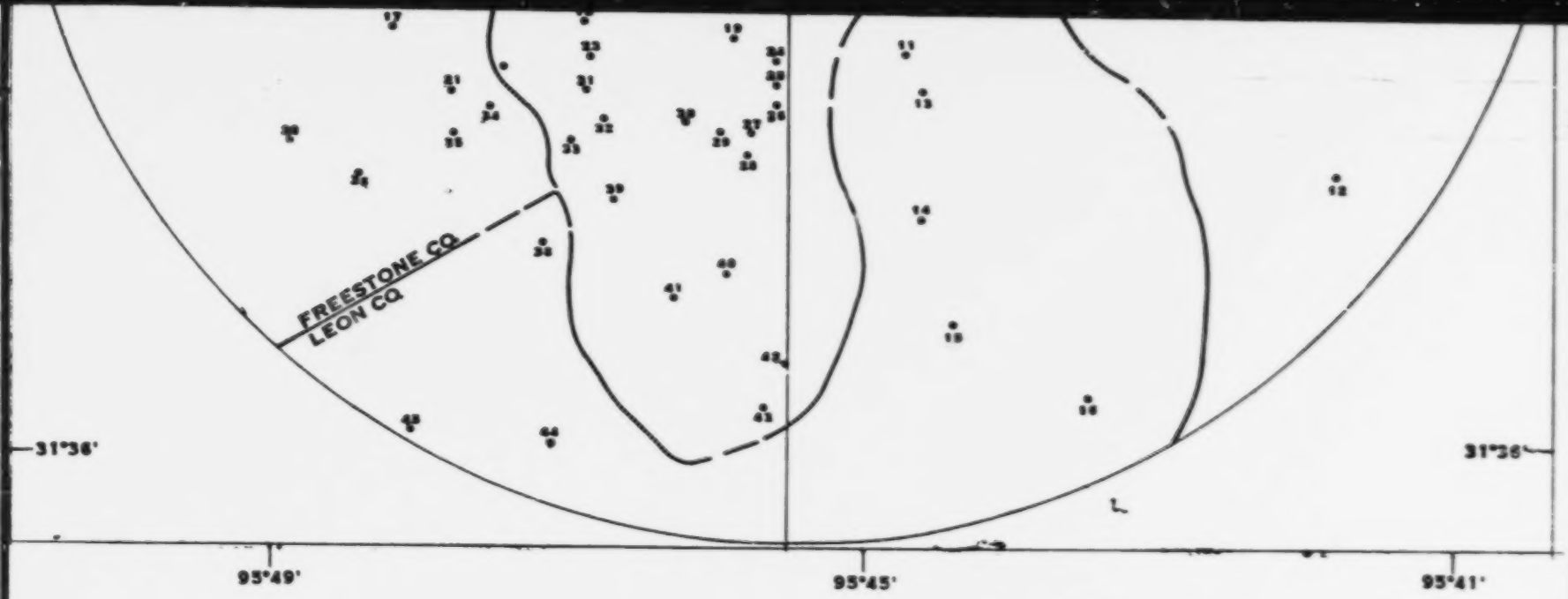

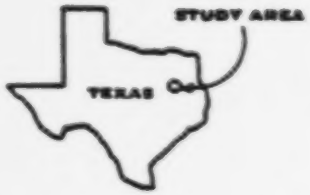

LEGEND:

HYDROCARBON WELL

STUDY AREA GRID

AREA ENLARGED SHOWN IN FIGURE A-4.1 PAGE 2 OF 2

A TABULATION OF THE WELLS IS PRESENTED IN TABLE A-4.1

WELLS WITHIN THE -3000 FEET MSL SALT CONTOUR ARE SHOWN IN FIGURE 7-2 IN VOLUME II

KELLY MAP, PALESTINE QUADRANGLE 6-1-68

1 0 1 MILES

1 0 1 KILOMETERS

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PREPARED	J.D.G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
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MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-4
LOCATION MAP OF WELLS USED IN ANALYSES

JOB NO. MV9700

FIGURE A-4.1
PAGE 2 OF 2

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 1 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
1-1	TEXAS CO. - Walton #1	9043	Pettet	180-9043
2-1	TEXAS CO. - Cook #2	6051	Woodbine	100-6050
2-2	TEXAS CO. - Cook #1	8880	Pettet	3289-8880
2-3	TEXAS CO. - Cumming G.U. #1	6200	Woodbine	100-6199
2-4	TEXAS CO. - Williams #1	6261	Woodbine	115-6260
2-5	TEXAS CO. - Williams #10	5752	Woodbine	1710-5746
2-7	TEXAS CO. - Hunter #2	5924	Woodbine	1689-5920
2-8	TEXAS CO. - Ross #2	5802	Woodbine	1731-5801
2-12	TEXAS CO.- Derden #1	8877	Travis Peak	127-8876
2-13	MCBEE - Nolley #1	9980	Rodessa	1688-9898
2-14	TEXACO, INC. (MCBEE) - Adams Cone #1	9880	Rodessa	146-9879
2-17	WILSON - Derden #1	10192	Rodessa	2314-10166
2-18	BUTLER - CROSS #1	5304	Woodbine	225-5293
3-1	MCCORMICK ET. AL. - Jenkins #1	10505	Travis Peak	1823-10503
3-2	TEXACO - Thompson #1	9786	Travis Peak	290-9782
3-3	MURCHISON (TEXAS CO.) - Gray #1	11603	Travis Peak	325-9989
3-4	STANOLIND - Weekley #1	10108	Travis Peak	256-10108
3-5	SUNRAY - Smith #1	5873	Buda	80-5867
3-6	SANDERS - Adams #1	10167	Travis Peak	300-10167
3-7	PAN AMERICAN - Stafford G.U. #1	13906	Gilmer	160-13888
3-8	MAY PETR. - Burnett #1	9996	Travis Peak	1500-9993
4-1	LA GORCE - Royall #1	5400	Woodbine	342-5395
4-2	BARNHART - Royall N.B. #1	5462	Woodbine	No Data
4-3	MAGNOLIA - Fitzgerald #1	5220	Woodbine	222-5217
4-4	HUMBLE - Fitzgerald #1	4806	Woodbine	177-4800
4-5	MORGAN BROS. - Concord #9	4794	Woodbine	180-4790
4-7	MAGNOLIA - Campbell #1	4669	Woodbine	599-4574
4-9	HUMBLE - Horwitz #1	12303	Pettet	100-12300

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EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 2 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
4-11	HUMBLE - Sampson #3-B	4755	Buda	175-4746
4-12	HUMBLE - Sampson #4-B	4745	Buda	165-4727
4-20	HUMBLE - R. Fitzgerald #1	4880	Buda	No Data
4-22	HUMBLE - Campbell #3	4480	Woodbine	168-4445
4-25	MEADOWS - Campbell #1	4540	Woodbine	150-4535
4-27	HUMBLE - Sampson #1	4620	Woodbine	165-4614
4-28	HUMBLE - Rogers #1	4720	Woodbine	170-4715
4-30	MAGNOLIA - Kelly #1	4786	Buda	221-4786
4-35	ANDRADE - Fitzgerald #1	5233	Woodbine	141-5232
4-36	CARTER-GRAGG - Jaramillo #1	5675	Woodbine	200-5670
4-37	AZALEA - Quick #1	5757	Woodbine	255-5757
4-38	DELTA - Ward #1	10825	Pettet	1790-10824
4-39	BROYLES - Broyles #1	5161	Woodbine	218-5145
5-1	HUMBLE - Mound Prairie G. U. (#1) #2	11090	Travis Peak	2350-11100
5-2	HUMBLE - (HAMMON) - Rust #1	11182	Pettet	2167-11174
5-4	DOUGLAS - Braley #1	5420	Woodbine	166-5420
5-5	HERRING - Conway #1	5580	Woodbine	238-5578
5-6	HUGHEY - Elrod #1	11202	Pettet	2018-11202
5-7	HUMBLE - Freeman #1	12686	Travis Peak	107-12607
5-8	HUMBLE - Collier #1	4480	Ector	No Data
5-9	HUMBLE - Royal N.B. #6-B	3644	Buda	231-3637
5-11	HUMBLE - Royall N.B. #3-B	3329	Woodbine	208-3325
5-12	VOIGHT - Royal N.B. #5-B	3216	Woodbine	200-3214
5-13	HUMBLE - Elrod #1	3824	Buda	206-3811
5-14	GRAHAM - Elrod #1	5598	Woodbine	208-5598
5-15	BR. AMER. - Terrell #1	11723	Pettet	2000-11721
5-16	MCKELLAR - Hall #1	5593	Woodbine	197-5566
5-17	SPENCE - Overton #1	5706	Woodbine	230-5706

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EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 3 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
5-18	HUMBLE - Elrod Est #1	11475	Travis Peak	100-11472
6-1	BIRDSONG - Royall N.B. #1	5517	Woodbine	150-4417
6-2	TALBERT - Weldon #1	5510	Woodbine	210-5510
6-3	HUNT - Weldon #1	11731	Pettet	2529-11731
6-4	COUGAR - Purvey #1	4407	Woodbine	201-4406
6-5	FAIR - Campbell #1	5205	Woodbine	215-5205
6-6	PAN. AM. - Furnish #1	11478	Travis Peak	203-11254
6-7	TEXAS CO. - Arrington #1	4920	Woodbine	424-4917
6-8	MAGNOLIA - Williams #2	4685	Woodbine	No Data
8-1	DANIEL - Hill #1	4665	Woodbine	194-4665
9-1	TEXAS CO. - Givens #1	8970	Pettet	148-8959
9-2	TEXAS CO. - Palmer #1	8707	Pettet	2056-8706
10-1	TEXACO - Givens G.U. #2	8703	Pettet	1632-8703
10-2	PURE - Cook #1	1610	Wilcox	No Data
10-3	TEXACO - Walton #2	10523	Travis Peak	122-10510
10-4	GRAGG - Gragg Unit (#2) #1	10110	Pettet	82-10108
10-5	GRAGG - Gragg #1	10270	Pettet	72-9797
10-6	TEXACO - Gee #1	10385	Pettet	No Data
10-7	HUMBLE - Royall N. B. #1	9850	Pettet	100-9850
10-8	BYRD-FROST - Owen #1	9748	Pettet	3102-9748
10-9	HUMBLE - Link #1	10103	Pettet	90-10103
10-10	CANADIAN - Jackson #1	5900	Georgetown	No Data
10-11	CONTINENTAL - Royall N.B. #5	9690	Travis Peak	250-9690
10-12	MAGNOLIA - Pugh #1	9719	Travis Peak	100-9719
11-2	HUMBLE - Rooney #1	10510	Travis Peak	1643-10496
11-3	LAMAR HUNT - Fort #1	10650	Travis Peak	1820-10645
11-4	MESSENGER - Davey #1-A	5120	Woodbine	300-1500
11-5	EPPERSON - Shelton #1	5868	Buda	228-5867
11-6	LAMAR HUNT - Lnr Co. #1	10628	Travis Peak	4950-10622

T1694C-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 4 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
11-7	SANDERS - Campbell #1	4995	Woodbine	286-4995
11-8	STD. OF TEXAS - Jackson #1	5100	Woodbine	253-5098
11-9	ROTARY DRLG. - Woolverton #1	4945	Woodbine	196-4938
11-10	CONTINENTAL - Royal N.B. #2	9821	Pettet	277-9821
11-11	CONTINENTAL - Royal N.B. #5	9692	Pettet	250-9692
11-12	CONTINENTAL - Royal N.B. #3	9705	Pettet	301-9705
11-13	SABIO (CONOCO) - Royal N.B. #1	9822	Travis Peak	No Data
11-14	TEXAS CO. - Nelms #1	9678	Pettet	3212-9630
11-15	CONTINENTAL - Dupuy #1	9664	Pettet	93-9662
11-16	SAMEDAN - McKenzie #1	9500	Rodessa	2004-9495
11-17	FORMBY - Douglas #1	5801	Buda	212-5800
11-18	TEXAS CO. - Holmes #1	10090	Pettet	353-10090
11-20	HUMBLE - Hudson #1	9825	Pettet	200-9706
11-21	TEXAS CO. - Williams #3	6135	Buda	100-6131
12-1	ROESER - Brooks #1	4166	Eagle Ford	0-4166
12-2	ROESER - Brooks #2	5211	Woodbine	8-5211
12-3	ROESER - Via #1	4331	Woodbine	0-4331
12-4	COSDEN - Douglas #1	4832	Woodbine	0-4832
12-5	BROYLES - Willhite #2	4605	Buda	250-4605
12-6	BROYLES - Willhite #1	4068	Buda	250-4050
12-7	TEXACO - O'Flynn #1	5863	Buda	100-5847
12-8	GEISELMAN - O'Flynn #1	4270	Eagle Ford	230-4262
12-9	NAVARRO - Greenwood #1	2460	Nacatoch	0-2460
12-10	LA RUE - Jernigan #1	3711	Austin	217-3708
12-11	TEXAS CO. - Greenwood #1	4032	Woodbine	563-3926
12-12	MCCORMICK ET. AL. - Jones #2	3859	Woodbine	230-3859
12-13	MCCORMICK ET. AL. - Jones #1	3927	Ector	No Data
12-14	TEXAS CO. - Greenwood #1-A	2185	Pecan Gap	60-1005

T1694D-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 5 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
12-15	CAPE OPER. - Vance #1	5250	Woodbine	200-5250
12-16	COSDEN - Douglas #2	3897	Eagle Ford	No Data
12-17	COSDEN - Adams #1	4000	Eagle Ford	No Data
13-1	STORM - Broyles #1	5650	Woodbine	300-5650
13-3	WESTLAND - Mitchell #1	6500	Buda	350-6499
13-6	FAIR - Quick #1	11307	Travis Peak	2160-11300
13-10	PERRYMAN - Royal Nat'l Bank #1	5540	Woodbine	120-5540
13-11	DANIEL - Handorf #1	5518	Woodbine	212-5514
13-12	BASIN OPER. (HUGHEY ET. AL.) - Gardner #1	10872	Travis Peak	1972-10858
13-13	KOHLBUSH - Gardner #1	5716	Woodbine	216-5715
13-14	HALBOUTY - Gardner #1	5790	Woodbine	222-5790
13-15	ALAMO (BOND OPER. CO.) - Royall Nat'l Bank #1	12500	Travis Peak	9700-12494
13-16	PEVETO - Barrett #1	5489	Woodbine	216-5458
13-17	GEN. AM. O. CO. - Royal Nat'l Bank #1	5700	Woodbine	265-5694
13-18	JOHNSON - Barnett #1	5564	Woodbine	300-5564
13-19	WHEELOCK - Harris #1	5985	Woodbine	300-5985
13-20	JOC (POTTER) - LeMarks #1	11018	Travis Peak	2203-11011
14-1	U.S. SMELTING - Bowker #1	5642	Woodbine	523-5642
14-2	MAGNOLIA - Williams #1	3920	Pecan Gap	No Data
14-3	PERRYMAN - St. John #1	5350	Woodbine	210-5326
14-4	KATZ - McDonald #1	5240	Eagle Ford	227-5238
14-5	JACKSON - McDonald #1	5513	Woodbine	231-5491
14-6	LATHAM - Smith #1	5139	Eagle Ford	260-5138
14-8	PHILLIPS - Ivins #1	4910	Woodbine	225-4902
14-9	HUNT - Carroll #1	5502	Woodbine	226-5503
15-1	PHILLIPS - Cook #1	4897	Woodbine	211-4900
15-2	RIDLEY - Davis #1	5016	Woodbine	98-5014
15-3	HEYSER - Cagle #1	5112	Woodbine	201-5110
15-4	FARMER - Grave #1	4953	Woodbine	250-4952

T-1694E-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 6 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
15-5	ADA O. CO. - Ezel #1	4880	Woodbine	840-4880
15-6	HINTON - Bowers #1	9511	Travis Peak	2133-9505
16-1	MONSANTO - Hill #1	5160	Woodbine	629-5158
16-2	BASIN (GLOBE) - Hill #1	4788	Woodbine	1050-4787
16-3	LA RUE - Steward #1	4780	Woodbine	250-4778
16-4	JOHNSON - Deys #1	5255	Woodbine	300-5255
16-5	RUDMAN - Hill #1	4517	Woodbine	212-4516
18-1	PLACID - Bell #1	5285	Woodbine	No Data
18-2	BRADLEY - Ward #1	9400	Rodessa	4530-9339
18-3	HINTON - Neumann #1	9025	Rodessa	1424-9021
18-4	CONTINENTAL - Carroll #1-A	9815	Travis Peak	100-9815
18-5	CONTINENTAL - Royal N.B. #1-A	10623	Travis Peak	110-10623
18-6	CONTINENTAL - Royal #1	9030	Rodessa	85-9030
18-7	CONTINENTAL - Royal N.B. #2-A	9664	Pettet	100-9664
18-8	CONTINENTAL - Cady #2	9060	Rodessa	1543-9054
18-9	CONTINENTAL - Cady #1	9800	Travis Peak	100-9800
18-10	SUN - Hill #1-A	9896	Travis Peak	1828-9895
18-11	COLLINS - Hill #1	5285	Woodbine	130-5275
18-12	TEXACO - Hill #1	5406	Woodbine	637-5406
18-13	MAGNOLIA PET. - Coleman #1	8938	Rodessa	71-8938
19-1	WHEELOCK - Huffman #1	9815	Travis Peak	1660-9815
19-2	SIMONS - Featers #1	5350	Woodbine	No Data
19-3	DEVON - Barrett #1	5262	Woodbine	510-5262
19-4	WALKER - Huffman #1	5133	Woodbine	542-5113
19-5	CONTINENTAL - Carrol #1	10052	Travis Peak	130-10004
19-6	HUGHEY - Huffman #1	10405	Travis Peak	1992-10404
19-7	BROYLES - Link #1	5885	Buda	213-5878
19-8	R. LACY - Hanks #1	5811	Buda	1602-5809
20-1	FARISH III - Waits #1	2030	Wilcox	200-2030
20-2	YEAKLEY - Waites #1-A	1852	Wilcox	No Data

T-1694F-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 7 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
20-4	UNION - Rairigh #1	5606	Woodbine	818-5606
20-5	PURE - City of Palestine #1	11886	Travis Peak	2160-11886
20-6	MILLER - Coble #1	5815	Woodbine	530-5815
20-8	BYARS - Pessoney #1	5666	Woodbine	146-5666
20-9	PYLE - Henderson #1	5638	Eagle Ford	700-5637
20-10	Yeakley - Waits #1	1604	Wilcox	No Data
20-11	AVERY - Henry #1	5303	Woodbine	No Data
20-12	JOHNSON - Armstrong #1	4736	Woodbine	300-4735
20-13	HUMPHREY - Bishop #1	5905	Woodbine	206-5905
20-14	KAEMMARER - Tippen #1	4267	Woodbine	208-4267
20-15	TEXACO - Davey #1	12141	Travis Peak	6955-12138
20-16	CARLSON - Barnard #1	5615	Woodbine	240-5614
21-1	HUGGINS - Huggins #1	5820	Woodbine	No Data
21-2	TIPTON - Chotiner #1	5807	Woodbine	106-5807
21-3	WIGGINS BROS. - Royal #1	5657	Woodbine	203-5656
21-4	SAMEDAN(TEXACO) - Winkler (Burkitt) #1	12600	Travis Peak	No Data
21-5	TEX-LAND (SAMEDAN) - Beane #1	10790	Pettet	2500-10762
21-6	TEXACO - Rutledge #1	10848	Pettet	100-10844
21-7	TEXACO - Hearne #1	10860	Pettet	99-10853
21-8	COATS - Kale #1	5632	Woodbine	218-5632
21-9	WHEELOCK - Howard #1	5918	Woodbine	607-5919
22-1	LA GORCE - Revill #1	5720	Woodbine	280-5714
22-2	ROCHE - Martin #1	5310	Woodbine	221-5310
22-3	PERRYMAN - Williams #1	5277	Woodbine	105-5265
22-4	EXXON - Hassell #1	9700	Pettet	No Data
22-5	CONE - Palestine M.&F. Club	5161	Woodbine	320-5158
22-6	BR. AMER. - Richardson #1	6307	Woodbine	497-6304
22-7	SANDS - Broyles #1	5680	Woodbine	214-5677
22-8	GREER - Wright #1	6010	Woodbine	No Data
22-9	ELLISON - James #1	5609	Woodbine	206-5604

T-1694G-0

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7/ BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 8 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
23-1	RIDLEY - S.P.L.C. #1	5100	Woodbine	210-5090
23-2	CHEVRON - Withers #1	8652	Rodessa	2200-8652
23-3	STD. OF TEX. - Trantham #1	13107	Gilmer	73-13103
23-4	HAMILTON - Davey #1	5030	Woodbine	370-5029
23-5	CONTINENTAL - Yanaway #2	8886	Travis Peak	300-8886
24-1	STEPHENS - Riley #1	4775	Woodbine	1020-4774
25-1	PHILLIPS (TEXACO) - Love #1	9250	Travis Peak	287-9250
25-2	GRIFFITH - Pittman #1	4769	Eagle Ford	157-4767
25-3	HUMBLE - Wooten #1	9470	Travis Peak	100-9470
25-4	LATIMER - Devereux G.U. #2	4641	Eagle Ford	98-4632
25-5	LATIMER - Devereux G.U. #3	4655	Eagle Ford	100-4651
25-6	PURNELL & COLEMAN - Ivy #1	4803	Woodbine	205-4803
25-7	PURNELL & COLEMAN - Swank #1	4927	Woodbine	213-4925
25-8	SANTA FE - Ivy #1	9512	Travis Peak	1094-9506
26-1	STROUBE (WATBURN) - Red #1	5245	Woodbine	250-5244
26-2	LATIMER - Devereux G.U. #4	4640	Woodbine	117-4619
26-3	HUMPHREY - Gilpin #1	5446	Woodbine	204-5438
26-4	SUN - Tyus #1	5880	Buda	505-5874
26-5	BROTHERS - Ball #1	5524	Woodbine	108-5524
27-1	OHIO - Hill #1	10115	Travis Peak	1400-10108
27-2	LA COASTAL - Hill #1	5880	Woodbine	303-5876
27-3	CONTINENTAL - Hill #1	10620	Travis Peak	90-10615
27-4	WHIFFEN - William #1	5360	Woodbine	201-5353
27-5	EMPIRE DRLG. - Marshall #1	5400	Woodbine	300-5394
27-6	GULF - Pearson #1	6013	Woodbine	4800-6007
27-7	F.R. JACKSON - Davey #1	5650	Woodbine	250-5642
27-8	MCBEE - Boyd #1	11675	Rodessa	8587-11657
27-9	SAMEDAN (TEXAS) - Daniel Mem. Orph. #1	12300	Travis Peak	10400-12294
27-10	SPENCE - Daniel Mem. Orph. #1	5418	Woodbine	212-5393
27-11	PERRYMAN - Daniel Mem. Orph. #1	5468	Woodbine	200-5467

T-1694H-0

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EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 9 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
28-1	KAHN - Conyers #1	5532	Woodbine	597-5526
28-2	TURMAN - Hrma #1	5975	Woodbine	322-5935
28-3	F.H.E. OIL CO. - Tom Pace #1	5634	Woodbine	2175-5634
28-4	F.H.E. OIL - Mathis Morrow #1	5338	Woodbine	2199-5338
28-7	TIDEWATER - Focke #3	5300	Woodbine	2125-5299
28-9	HUNT - Keeling #1	5343	Woodbine	2158-5342
28-11	HUNT (HURBROUGH) - Jerry Brantley #1	5332	Woodbine	3350-5304
28-12	HUNT - Brantley #B-1	5322	Woodbine	3450-5322
28-13	TIDEWATER-SEABOARD - Shaw & Cern #7	5331	Woodbine	3450-5331
28-14	TIDEWATER-SEABOARD - Shaw & Cern #20	5311	Woodbine	2115-5311
28-15	TIDEWATER-SEABOARD - Frank Evans #2	5338	Woodbine	4550-5338
28-16	TIDEWATER-SEABOARD - Shaw & Cern #18	5269	Woodbine	2120-5269
28-17	TIDEWATER-SEABOARD - Shaw & Cern #19	5275	Woodbine	2117-5275
28-18	TIDEWATER-SEABOARD - Shaw & Cern #13	5280	Woodbine	2118-5280
28-19	TIDEWATER ASSOC. - Alex Samuel #1	5343	Woodbine	2121-5343
28-21	TIDEWATER ASSOC. - P. Smith #1	5343	Woodbine	5100-5343
28-22	HUNT - D. Cern #1	5316	Woodbine	4540-5316
28-23	HUNT - H.R. Dietz #2	5265	Woodbine	4470-5265
28-24	TIDEWATER - Evans #3	5337	Woodbine	2120-5337
28-25	TIDEWATER - Evans #4	10686	Travis Peak	2120-10685
28-26	TIDEWATER - Evans #2	5338	Woodbine	4550-5338
28-27	SMITH - J. Lozica #1	5340	Woodbine	4500-5340
28-28	OWNBY - Lubben #1	5327	Woodbine	2150-5237

T-16941-0

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73BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 10 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
28-29	TIDEWATER - Scott #1	5316	Woodbine	2125-5316
28-30	OWNBY - Lubben #2	5285	Woodbine	350-5280
28-31	OWNBY - Stott #1	5309	Woodbine	237-5306
28-32	HAMILL - Dietz #2	5550	Woodbine	No Data
28-33	NATL. EXP. - Dietz #1	6202	Washita	No Data
28-34	WHEELOCK - Dietz #1	5500	Woodbine	583-5495
28-35	LA COASTAL - Carter #1	5730	Woodbine	No Data
28-36	JOHNSON - Carter #1	6102	Woodbine	No Data
28-38	MCCUTHIN - Evans #1	5286	Woodbine	4850-5281
28-39	NEVERSUCH - E. D. Smith #1	5309	Woodbine	5150-5309
28-40	NATL. EXPL. - Johnson Smith #1	5310	Woodbine	350-5309
28-41	HAMILL - Johnson #1	6035	Buda	340-6035
28-42	BYRD-FROST - E. Johnson #1	5454	Woodbine	1052-5454
28-43	BYRD-FROST - McGaughey #1	5452	Woodbine	No Data
28-45	TIDEWATER-SEABOARD - Reagan #1	5297	Woodbine	3500-5297
28-46	TEXACO (CONE) - Boyd #1	6625	Buda	1017-6623
28-47	TIDEWATER-SEABOARD - Martin #1	5313	Woodbine	2199-5312
29-6	TEXAS - Barry #1	5047	Woodbine	140-5047
29-7	TEXAS CO. - Long #1	4335	Salt	287-4335
29-8	LACY - Abbott #1	5475	Woodbine	4800-5475
29-9	ANCO - A. E. Irwin #1	5427	Woodbine	1987-5422
29-10	TEX-HARVEY - Swanson #1	5406	Woodbine	2020-5405
29-11	ASHLAND - Swanson Est. #1	5491	Woodbine	No Data
29-12	F.H.E. - Morrow #3	5348	Woodbine	5200-5348
29-13	F.H.E. - Moody #2	5410	Woodbine	No Data
29-14	PATTON & PHILLIPS (ANCO) - Byrd #1	5330	Woodbine	No Data

BEST DOCUMENT AVAILABLE

T1694J-0

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 11 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
29-16	F.H.E. - Robinson #1	5359	Woodbine	2224-5359
29-17	MCCUTCHIN - Reagan #2	5379	Washita	4750-5379
29-18	MCCUTCHIN - Reagan #2-B	5318	Woodbine	No Data
29-19	TEX-HARVEY - Cartmel #3	5404	Woodbine	2031-5403
29-20	TEX-HARVEY - Cartmel #8	5417	Woodbine	1976-5417
29-21	LONG LAKE PROD. - S.E.J. Cartmel #1	5516	Woodbine	2019-5446
29-22	TEX-HARVEY - W. R. Collier #1	5423	Woodbine	1991-5423
29-23	TEX-HARVEY - S.E.J. Cartmel #7	5402	Woodbine	1945-5402
29-24	TEX-HARVEY - Cartmel #2	5464	Woodbine	2020-5434
29-25	TEX-HARVEY - Ellis #1	5416	Woodbine	1927-5416
29-26	HUNT - Lee Cato #1	5388	Woodbine	4700-5388
29-27	SMITH - J. Lozica #1	5340	Woodbine	4500-5340
29-28	HUNT - Keeling #1	5400	Woodbine	4698-5400
29-30	HUNT - Palestine #1	5364	Woodbine	5100-5364
29-31	MEEKER - F.N.B. of Palestine #1	5345	Woodbine	3200-5343
29-32	TIDEWATER-SEABOARD - W. V. Keeling #2	5334	Woodbine	2120-5334
29-33	TIDEWATER-SEABOARD - W. V. Keeling #1	5344	Woodbine	3450-5344
29-34	TIDEWATER-SEABOARD - Shaw & Cern #8	5331	Woodbine	3475-5331
29-35	TIDEWATER-SEABOARD - Shaw & Cern #10	5338	Woodbine	2110-5338
29-36	HUNT - E. Tucker #1	5396	Woodbine	5100-5396
29-38	CARTER-CRAGG - M. L. Beiler #1	5359	Woodbine	2000-5357
29-39	HUNT - Sutton-Woolverton #1	5383	Woodbine	2199-5383
29-40	HUNT - Broyles & Woolverton #4	5360	Woodbine	5000-5360
29-41	HUNT - Broyles & Woolverton #5	5405	Woodbine	4770-5405
29-42	TIDEWATER-SEABOARD - Keeling #1	5344	Woodbine	3450-5344

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 12 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
29-43	TEX-HARVEY - Cartmel #6	5416	Woodbine	2042-5414
29-44	TEX-HARVEY - Cartmel #1	5387	Woodbine	2061-5387
29-45	TEX-HARVEY - J. G. Collier - Carr #1	5910	Washita	2007-5386
29-46	HUNT - Broyles-Woolverton #2	5375	Woodbine	2156-5375
29-48	HUNT - Sutton-Woolverton #2	5373	Woodbine	2197-5350
29-49	BYRD-FROST - E. Tucker #1	5364	Woodbine	4600-5364
29-52	HUNT - E. Tucker #1	5397	Woodbine	5100-5397
29-53	TIDEWATER-SEABOARD - Shaw & Cern #14	5339	Woodbine	2125-5339
29-54	TIDEWATER-SEABOARD - Shaw & Cern #17	5340	Woodbine	2128-5340
29-56	TIDEWATER-SEABOARD - Shaw & Cern #6	5343	Woodbine	No Data
29-57	TIDEWATER-SEABOARD - Shaw & Cern #16	5340	Woodbine	2120-5340
29-58	TIDEWATER-SEABOARD - Shaw & Cern #9	5340	Woodbine	2118-5340
29-59	TIDEWATER - Samuel #3	5340	Woodbine	No Data
29-60	TIDEWATER-SEABOARD - Z. Williams #2	5340	Woodbine	3475-5340
29-61	TIDEWATER-SEABOARD - Z. Williams #1	5340	Woodbine	3475-5340
29-63	HUNT - Robinson-Hombs #2	5345	Woodbine	4550-5345
29-64	STANOLIND - Robinson #1	5344	Woodbine	3485-5344
29-65	HUNT - Cartmel #1	5344	Woodbine	5100-5344
29-66	HUNT - Robinson-Hombs #3	5340	Woodbine	4800-5340
29-67	HUNT - Robinson-Hombs #1-B	5343	Woodbine	2139-5340
29-68	HUNT - Cartmel #2	5344	Woodbine	2000-5344
29-69	HUNT - Cartmel #3	5332	Woodbine	4600-5332
29-71	TIDEWATER-SEABOARD - P. Smith #2	5340	Woodbine	3450-5340
29-72	HUNT - A. W. Poole #1	5370	Woodbine	5190-5370

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 13 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
29-73	HUNT - M.L. Beiler #1	5388	Woodbine	3600-5388
29-74	HUNT - E. Tucker #1	5398	Woodbine	No Data
29-75	BYRD-FROST - E. Tucker #1	5363	Woodbine	4600-5364
29-76	TIDEWATER-SEABOARD - Shaw & Cern #6	5398	Woodbine	5100-5397
29-77	HUNT - Anderson #3	5330	Woodbine	2207-5319
29-78	HUNT - Anderson #2	5358	Woodbine	4500-5358
29-79	HUNT - Anderson #4	5308	Woodbine	2141-5303
29-80	HUNT - Anderson #1	5338	Woodbine	4500-5338
29-81	MCCUTCHIN - Keeling #1	5354	Woodbine	3500-5353
29-83	ANCO GAS CORP. - Chastain #1	5353	Woodbine	2100-5353
29-84	KING - Collier #1	5440	Woodbine	513-5434
29-85	Whitson - Collier #1	5408	Woodbine	No Data
29-86	JACKSON - Graves #1	5480	Woodbine	207-5478
29-87	JACKSON - Wooley #1	5454	Woodbine	213-5448
29-88	STANOLIND - Porter #1	5371	Woodbine	4950-5371
29-89	HUNT - Poole #1	5372	Woodbine	5190-5372
29-90	HUNT - Pink Smith #1	5355	Woodbine	2211-5353
29-91	HUNT - Smith #3	5450	Woodbine	No Data
29-92	HUNT - Smith #1	5342	Woodbine	2187-5337
29-94	TIDEWATER-SEABOARD - Keeling #1	5404	Woodbine	4698-5400
29-96	PHILLIPS - Dorsey #1	5454	Woodbine	288-5453
29-97	TENNECO - Dorsey-Temple #1	10278	Travis Peak	2130-10277
29-98	PHILLIPS - McCullen #1	5498	Woodbine	248-5493
29-100	HUNT - Hathcock #1	5336	Woodbine	2142-5336
29-101	GULF STATES - Collier #2	5434	Woodbine	618-5434
29-102	GULF STATES - Collier #1	5478	Woodbine	611-5478
29-103	HUMPHREY -E. Tx. Nat'l. Bnk. #1	5713	Woodbine	203-5713
29-104	TEX-HARVEY - J.K. Collier #2	5591	Woodbine	577-5588

T-1694M-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 14 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
30-1	ORDEN - McFarlane #1	5960	Woodbine	610-5956
30-2	PERRYMAN - McFarlane #1	12210	Travis Peak	No Data
30-3	JORDAN - Morris #1	6220	Woodbine	777-6206
30-4	FROST - Persons #1	6026	Woodbine	197-6021
30-5	TEX-HARVEY - Cartmel #1	5516	Woodbine	319-5516
30-6	SECURE TRUSTS - Helms Gas Unit #1	11491	Pettet	2023-11484
30-7	TEX-HARVEY - Hudson #1	5584	Woodbine	2009-5454
30-8	HAYS - Burkitt #1	5748	Woodbine	212-5742
30-9	KATZ - Royal N.B. #1	5750	Woodbine	508-5750
30-11	EBRO - Smith #1	5685	Woodbine	250-5685
30-12	JOHNSON - Sammons #1	5678	Woodbine	204-5672
31-1	HUMPHREY - Camp #1	6025	Woodbine	218-6008
31-3	ARCADIA - Wilson #1	5710	Woodbine	363-5710
31-4	BRYANT - McCain #1	5398	Woodbine	228-5392
31-5	JOHNSON - Moore #1	5046	Woodbine	225-5040
32-1	BR. AMER. - Davey #1	6215	Buda	329-6212
32-2	THRASH (LAKE) - Day #2	5732	Woodbine	4400-5725
32-3	HEDGE (JOHNSON) - Johnson #1	5603	Woodbine	420-5582
33-1	BYARS - Riley #1	4702	Woodbine	140-4702
33-2	PITTS OIL - Perry #1	9898	Travis Peak	1180-9886
34-1	HERRING - Hill #1	4724	Woodbine	174-4719
34-2	HUMBLE - Weaver #1	4941	Woodbine	122-4940
34-3	CLARK - Burgher #1	9185	Travis Peak	1108-9185
34-4	HUMBLE - Burgher #1	9200	Travis Peak	7900-9198
34-5	WATBURN - Burgher #1	4960	Woodbine	350-4912
34-6	PITTS OIL ET AL - Chamar G.U. #1	9991	Travis Peak	No Data
34-7	WISENBAKER - George #1	9900	Travis Peak	No Data
34-8	HUMBLE - Red Lake G.U.(3) #2-A	15970	Louann	1700-15970
35-2	KILLAM - Killam #1	5325	Woodbine	403-5325

T-1694N-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 15 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
35-3	HUMBLE - Greer #2-C	9894	Travis Peak	150-9893
35-4	EPPERSON - Greer #1	5175	Woodbine	214-5174
35-5	HUMBLE - Greer #1-C	5275	Woodbine	634-5271
35-6	WHIFFEN - O'Barr #1	5300	Woodbine	No Data
35-7	BASIN OPER. - Burgher	4600	Eagle Ford	228-4549
35-8	SAMEDAN OIL - Winter #1	10205	Travis Peak	1838-10204
35-9	HUMBLE - Butler G.U. (#2) #1	5798	Buda	633-5798
35-10	H.O.R. (LECUNO) - E. Tex. N. B. #1	5432	Woodbine	160-5431
35-11	PRAIRIE PROD. - E. Tex. N. B. #1	5515	Woodbine	500-5515
35-12	STEWARD - Harris #1	5300	Woodbine	205-4273
35-13	PERRYMAN - Childs #1	4855	Eagle Ford	No Data
35-14	BELCO PETR - McCallum #1	5275	Woodbine	211-5275
35-15	HUMBLE - R.L.G.U. #3	9384	Travis Peak	100-9380
35-16	HUMBLE - Red Lake G.U. #2	9344	Travis Peak	200-9333
36-2	PERRYMAN - Daniel M.O. #4	5047	Woodbine	177-5047
36-3	PERRYMAN - Daniel M.O. #3	5749	Woodbine	164-5743
36-4	PERRYMAN - Daniel M.O. #1	5465	Salt	200-5465
36-5	WHIFFEN - Daniel M.O. #2	4500	Salt	140-4500
36-6	CARTER-GRAGG - Mims #1	5295	Woodbine	987-5292
36-7	HUMBLE - Washington #1	5240	Woodbine	625-5240
36-8	HUMBLE - Greer #1	5814	Washita	100-5812
36-9	HUMBLE -Butler #5	5250	Woodbine	635-5247
36-10	HUMBLE - Greer #1B	5298	Woodbine	100-5292
36-11	GRAHAM - Britton #1	5331	Woodbine	287-5331
36-12	SPENCE & JORDAN - Hale #1	5421	Woodbine	250-5421
37-1	McCUTHIN - R. Williams #1	5295	Woodbine	4900-5201
37-2	HUNT - More #1	5296	Woodbine	5150-5296
37-3	TIDEWATER - M.J. Reagan #1	5297	Woodbine	3500-5297

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 16 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
37-4	TIDEWATER-SEABOARD - M. J. Reagan #2	5282	Woodbine	3450-5282
37-5	HOWARD ET. AL. - Carter #1	5288	Woodbine	420-5282
37-6	ANCO - J. Reeves #1	5309	Woodbine	1062-5309
37-7	STROUBE - Smith #2	4980	Eagle Ford	347-4976
37-8	NATL. EXPL. - Reagan #1	5480	Eagle Ford	358-5480
37-9	HOWARD ET. AL. - Carter #2	5337	Woodbine	447-5337
37-10	STANOLIND - Carter #1	5286	Woodbine	2187-5286
37-12	TIDEWATER ASSOC. - Ficken #3	5312	Woodbine	2219-5311
37-13	KILLINGSWORTH - Tull #2	5292	Woodbine	1900-5292
37-14	TIDEWATER-SEABOARD - Evans #1	5313	Woodbine	2157-5313
37-15	STROUBE ET AL - Monnig #13	5353	Woodbine	349-5337
37-16	MCCORMICK - Haley #2	5517	Woodbine	243-5504
37-17	MCCORMICK - Haley #1	5445	Woodbine	267-5445
37-18	TIDEWATER - L. Reeves #2	5313	Woodbine	2158-5313
37-19	TIDEWATER ASSOC. - Monning #18	5332	Woodbine	2113-5332
37-20	CARTER-GRAGG - Colbert #1	5263	Woodbine	2053-5263
37-21	CARTER-GRAGG - Johnson #1	5306	Woodbine	4600-5306
37-22	HUNT - D. Cern #1	5316	Woodbine	4540-5316
37-23	HUNT - H.R. Dietz #2	5265	Woodbine	4470-5265
37-24	TIDEWATER ASSOC. - Monning #21	5298	Woodbine	2200-5298
37-25	TIDEWATER ASSOC. - Monning #22	5305	Woodbine	2212-5303
37-26	TIDEWATER ASSOC. - J.O. Monning #23	5304	Woodbine	2194-5300
37-27	TIDEWATER ASSOC. - J.O. Monning #15	5262	Woodbine	2125-5262
37-28	TIDEWATER - SEABOARD - J.O. Monning #19	5239	Woodbine	2142-4909
37-29	GETTY - J.O. Monning #25	5404	Woodbine	310-5404
37-30	STROUBE & STROUBE - J.O. Monning #10	5370	Woodbine	632-5366

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 17 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation Group at Termination	Logged Interval (ft.)
37-31	STROUBE & STROUBE - Monning #2	5263	Woodbine	2177-5263
37-32	STROUBE & STROUBE - Monning #1	5261	Woodbine	2203-5259
37-33	STROUBE & STROUBE - Monning #3	5263	Woodbine	2199-5263
37-34	CARTER-GRAGG - Campbell #4	5280	Woodbine	2148-5273
37-35	CARTER-GRAGG - Campbell #7	3770	Eagle Ford	288-3766
37-36	CARTER-GRAGG - Campbell #1	5238	Woodbine	2185-5238
37-37	CARTER-GRAGG - Barkley #1	5529	Woodbine	1006-5529
37-38	CARTER-GRAGG - Ludwich #1	5470	Woodbine	1862-5470
37-39	STROUBE - Monning #2A	8990	Pettet	2454-8989
37-40	TIDEWATER - Monning #1-D	10016	Travis Peak	2200-10012
37-41	STROUBE - Monning #1-A	9873	Travis Peak	2362-9869
37-42	CARTER-GRAGG - Long Lake #1	10000	Travis Peak	No Data
37-43	ADAM CONE - J.O. Monning #2	5408	Woodbine	4901-5400
37-44	CARTER-GRAGG - Carter #4	5559	Woodbine	No Data
37-45	JAKE HAMON - Carter-Gragg #1	10500	Travis Peak	2160-10486
38-1	TIDEWATER - Howard et. al. #1	5297	Woodbine	No Data
38-2	HUNT - Hutcherson #1	5352	Woodbine	3000-5352
38-3	HUNT - Geo Smith #2	5364	Woodbine	2165-5353
38-4	KING - Collier #1	5579	Woodbine	510-5577
38-5	GULLEY - Nivens #1	5755	Woodbine	210-5742
38-6	TENNECO OIL CO. - Moser G.U. #1	10034	Pettet	2256-10030
38-7	HUNT - Long Lake G.U. #1	10146	Travis Peak	2020-10145
38-8	CARTER-GRAGG - E. Morrow #4	5615	Woodbine	318-5611
38-9	STANOLIND - Woodhouse #1	5271	Woodbine	4930-5271
38-10	TIDEWATER - Johnson #1 G.U. (D-1)	9875	Travis Peak	2007-9871
38-11	TIDEWATER - Johnson #1-B	5271	Woodbine	2172-5271
38-12	GRELLING - Bridges #1	5740	Woodbine	232-5739
38-13	CARTER-GRAGG - Johnson #3	5276	Woodbine	1835-5274
38-14	CARTER-GRAGG - Carter #4	5280	Woodbine	1979-5280

T-1694Q-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 18 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
38-15	GIBSON - Reeves #1	5420	Woodbine	614-5420
38-16	GIBSON - Carter #1-C	5402	Woodbine	611-5401
38-17	HUMBLE - McLen #1	10071	Travis Peak	431-10070
38-18	GOLDSTON - Parrish #1	5411	Woodbine	303-5411
39-1	HANKHAMER - McCann #1	5721	Woodbine	325-5720
39-2	GIESELMAN - Spencer #1	12133	Travis Peak	9430-12130
39-3	COCHRAN - Farris #1	5704	Woodbine	108-5704
39-4	GIST - Wilson #1	5810	Woodbine	215-5804
39-5	SHELL - Kyle #1	5800	Woodbine	170-5794
39-6	MEEKER - Warren #1	5470	Woodbine	644-5471
39-7	CARTER-GRAGG - Davey #1	5577	Woodbine	595-5577
39-8	GIST & GLOBE - Jackson #1	5680	Woodbine	214-5672
39-9	PHILLIPS ET. AL. - Presley #1	10482	Travis Peak	2770-10482
40-1	FAIR - Fincher #1	5750	Woodbine	213-5744
40-2	BRYANT - Denson	5681	Woodbine	228-5675
40-3	WILSON - Mace #1	5466	Woodbine	207-5466
40-4	TALBERT - Fincer #1	5314	Woodbine	217-5308
40-5	JOHNSON-GIST - Maddux #1	6007	Woodbine	219-6001
40-6	TALBERT - Pine Lodge #1	6021	Woodbine	234-6021
40-7	GLOBE DRLG - Campbell #1	5916	Woodbine	218-5910
40-8	WILSON-ANGLY - Wolf #1	5644	Woodbine	193-5642
40-9	CONE - Conn #1	5629	Woodbine	222-5630
40-10	HUGHEY - Josie Lewis #1	5610	Woodbine	218-5603
40-11	ELKHART - Durnell #1	2880	Wilcox	No Data
40-12	POWELL - Davey #1	6100	Woodbine	196-6100
40-13	BRACKEN - Salmon #1	5946	Woodbine	373-5946
40-14	KILLINGSWORTH - Lassiter #2	6128	Woodbine	202-6197
40-15	JOHNSON - Raymond #1	6336	Eagle Ford	214-6336
41-1	KRASMER - Wallace #1	6213	Woodbine	No Data
42-1	WILSON - Wheelus #1	4990	Woodbine	220-4986

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 19 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
43-1	KILLAM - Hartley #1	5645	Woodbine	441-5639
43-2	ATLANTIC - Clary #1	5042	Woodbine	155-5036
43-3	SKELLY - Gehrels #1	15192	Smackover	1785-15192
43-4	EXXON (HUMBLE) - Gehrels #1 Burleson Hill (G.U. #1) #1	9132	Travis Peak	200-9130
43-5	HUMBLE - McAdams #1	9645	Travis Peak	90-9639
44-1	KEECHI - McKennon #1	4016	Pecan Gap	8-4016
44-2	WYNN - Brown #1	6092	Woodbine	161-6023
44-3	ROBERTS ET. AL. - Reed et. al. #1	6475	Washita	212-6464
44-4	HANSBRO - Richardons #1	6120	Woodbine	100-6120
44-5	ROXANA - Thiele #1	3955	Lower Taylor	10-3995
44-6	MCBEE - Settlemyre #1	6359	Woodbine	727-6358
44-7	HOLT-YOUNG - Chambers #1	6195	Eagle Ford	0-6146
44-8	CREIGHTON - Holley #1	5395	Austin	0-5395
44-9	MCBEE - Holley #1	5870	Woodbine	204-5870
44-10	BASIN - Holley #1	5640	Woodbine	204-5632
44-11	KEECHI - Pickens #1	3803	Pecan Gap	10-3740
45-1	HARRISON - Leone Plant #1	2350	Wilcox	259-2350
45-2	P.G. LAKE - Leone Plant #1	5929	Woodbine	454-5925
45-3	CARTER-GRAGG - Campbell #1	5818	Woodbine	716-5818
45-4	TEXAS CO. - Prasifka #1	6000	Woodbine	1890-5999
45-5	MANLEY - Campbell #1	5914	Woodbine	212-5902
45-6	STEPHENS - Pope #1	6116	Woodbine	236-6115
45-7	CARTER-GRAGG - Holly #1	6148	Woodbine	1015-6148
45-8	HAMMON - Dunlap #1	6088	Woodbine	5[illegible]-6090
45-9	HUMBLE - Hannan #1	5930	Woodbine	43-5922
45-10	HUMBLE - Childs #1	5950	Woodbine	100-5950
45-11	HUMBLE - Wynne #1	5845	Woodbine	150-5837
46-1	ARMSTRONG - Moore #1	6286	Woodbine	215-6281
46-2	HALBOUTY - Carter #1	5920	Woodbine	206-5919

T-1694S-0

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83

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 20 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
46-3	CARTER-GRAGG - E. Carter #1	5873	Woodbine	2228-5873
46-4	CARTER-GRAGG - Dixon #1	5757	Woodbine	198-5750
46-5	CARTER-GRAGG - Carter #2	10485	Travis Peak	2210-10480
47-1	DANCIGER - Knight #1	5832	Woodbine	202-5832
47-2	HOWARD - Coleman #1	5780	Woodbine	210-5780
47-3	TEXAS CRUDE - Lassiter #1	10863	Travis Peak	370-6384
47-4	HALBERT - Dickerson #1	5900	Woodbine	222-5898
47-5	FULLER - Red Town Farm #1	5841	Woodbine	100-5841
47-6	PHILLIPS & RUDMAN - Burke #1	10891	Travis Peak	2997-10885
47-7	CLARK & GABRIEL - Moore #1	6060	Woodbine	452-6047
47-8	COATS - Lively #1	5997	Woodbine	203-5997
47-9	TEXAS CRUDE - Lipsey #1	10515	Travis Peak	2550-10511
48-1	GREAT PLAINS - Daniels #1	6300	Woodbine	500-6295
48-2	GEER - Pierson #1	6210	Woodbine	300-6210
48-3	HUMBLE (BROYLES) - Rogers #1	10212	Travis Peak	2553-10212
48-4	VOCKEL - Rogers #1	5998	Woodbine	728-5598
48-5	HUMBLE - Brown #1	10762	Travis Peak	2532-10758
48-7	GRELLING - Durnell #1	6081	Woodbine	228-6081
48-8	ROBBINS - Pridgen #1	686	Carrizo	228-685
49-1	JACKSON - Webb #1	6211	Woodbine	208-6211
49-2	JOHNSON - Brown #1	6318	Woodbine	212-6312
49-3	ROBBINS - McElroy #1	5940	Eagle Ford	233-5920
49-4	LA COASTAL - Bridges #1-A	6898	Woodbine	286-6883
49-5	JACKSON - Kersch #1	6003	Woodbine	210-5951
49-6	JACKSON - Brown #1	6245	Eagle Ford	200-6220
50-1	KRASNER - Wallace #1	6213	Woodbine	No Data
52-1	MCFARLANE - Henson #1	6256	Wodbine	398-6256
52-2	JORDAN - Van Winkle #1	6230	Woodbine	210-6230
52-3	P.G. LAKE - Burroughs #1	6316	Woodbine	236-6280
52-4	FRANKEL - Cochran #1	6247	Woodbine	524-6246

T-1694T-0

BEST DOCUMENT AVAILABLE

EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 21 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
52-5	PHILLIPS - Coldiron #1	6120	Woodbine	220-6106
52-6	OGG - Pearlstone #1	5936	Woodbine	No Data
53-1	KATZ - Keep #1	6050	Woodbine	696-6050
53-2	TEXACO - Keep #1	10707	Travis Peak	150-10701
53-3	STEWARD - Keils #1	6100	Woodbine	753-6098
53-4	MCCORMICK-HAMILL - Reckhor #1	16500	Bossier	0-16500
53-5	ROWE - Keils #1	5910	Woodbine	164-5899
53-6	ROBERTS ET. AL.-Cadenhead et.al.#1	5731	Eagle Ford	180-5731
53-8	MARINO - Harrington #1	5850	Eagle Ford	222-5840
53-10	ROBERTS-HAMMACK - Jeter-Chastain #1	5875	Eagle Ford	219-5870
53-13	ROBERTS-HAMMACK - Jeter #2	5786	Eagle Ford	218-5781
53-14	ROBERTS ET. AL. - Jeter #1-A	5798	Eagle Ford	200-5792
53-15	ROBERTS-HAMMACK - Allbright #1	5810	Eagle Ford	209-5786
53-16	ROBERTS ET. AL. - Cadenhead et. al. #1	5810	Eagle Ford	213-5726
53-21	MURRAY - Pearlstone #1	5676	Woodbine	211-5675
53-22	HUGHES-Pearlstone #1	5560	Woodbine	2121-5560
53-23	LONE-STAR - Moore #1	5297	Woodbine	No Data
53-24	LONE-STAR - Bain #4	5775	Eagle Ford	2203-5775
54-1	SCHNEIDER & COREY - Roach #1	6274	Woodbine	208-6270
54-2	CARLSON - Coats #1	5795	Woodbine	111-5794
54-3	RIDLEY - Longley #1	5865	Woodbine	160-5865
54-4	FISHER - Coats #1	5750	Woodbine	245-5744
54-5	HUMBLE - S.W. Oakwood G.U. 11 #1	5910	Woodbine	90-5908
54-6	HUMBLE - Keller #1	5930	Woodbine	200-5930
54-7	HUMBLE - S.W. Oakwood G.U. 5 #2	5915	Woodbine	200-5910
54-8	HUMBLE - S.W. Oakwood G.U.5 #1	6500	Buda	200-6500
54-9	HUMBLE - Harrod #1	5850	Woodbine	140-5842
54-10	HUMBLE - S.W. Oakwood G.U.2 #1	5840	Woodbine	250-5838

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EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 22 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
54-11	HUMBLE - S.W. Oakwood G.U.3 #1	5800	Woodbine	200-5800
54-12	HUMBLE - S.W. Oakwood #10	6820	Buda	100-6820
54-13	EVANS - Thrash #1	5800	Woodbine	616-5796
54-14	AKARD - Thrash #2	5750	Woodbine	634-5748
54-15	AKARD - Thrash #1	6277	Woodbine	523-6273
54-16	SMITH, AMORUSO & WHITESTONE - Thrash #1-A	6715	Woodbine	673-6710
54-17	PETRODYNAMICS (PAX PETR) - Smith #1	5560	Woodbine	287-5433
54-18	HUMBLE - Foran #1	10610	Travis Peak	150-10610
55-1	BASIN OPER. - Thrash et. al. #1	10850	Travis Peak	9250-10830
55-2	LONE STAR - Pate #2-B	6000	Woodbine	163-5999
55-4	HUMBLE - Harris #3	10771	Travis Peak	785-10770
55-5	AZALEA - DeVaughn #1	5877	Woodbine	219-5871
55-6	ARMSTRONG - Williams #1	6241	Woodbine	204-6235
55-7	FORTSON - Bell #1	6345	Woodbine	235-6344
55-8	BASIN OPER. - Leone Plant #1	5645	Eagle Ford	210-5643
55-9	HUMBLE - S.W. Oakwood G.U.6 #1	6050	Woodbine	200-6049
55-10	UNION OF CALIF. (HUMBLE) - Rennoe #1	10590	Trinity	2000-10590
56-1	KATZ - Moody #1	6005	Woodbine	90-6005
56-2	JACKSON - McCall #1	5908	Woodbine	632-5904
56-3	SPENCE - Moody #1	5975	Woodbine	640-5975
56-4	HUMBLE - Johnson #1	5880	Woodbine	1728-5908
56-5	ABADOU - Leone Plantation #3-A	5927	Woodbine	No Data
56-7	JOHNSON - Bell #1	5861	Woodbine	668-5861
57-1	TRICE - Matthews #1	6125	Woodbine	218-6123
57-2	F. R. JACKSON - Matthews #1	6195	Woodbine	337-6195
57-3	NEW SEVEN FALLS - Jones #1	6041	Woodbine	723--6033
57-4	JACKSON - Hamby #1	6150	Woodbine	213-6144
57-5	JACKSON - Dailey #1	6134	Woodbine	308-6128

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EAST TEXAS STUDY AREA

APPENDIX A-4

TABLE A-4.1 (Page 23 of 23)

STUDY AREA WELL DATA

LETCo Well Number	Well Name	Total Depth (ft.)	Formation/Group at Termination	Logged Interval (ft.)
57-6	WALKER - Sheperd #1	6010	Woodbine	644-6010
57-8	ARCADIA - Dailey #4 "A"	5852	Woodbine	No Data
57-9	LAKE - Huff #1	6316	Woodbine	603-6314
57-10	WILLIAMSON - Fox #1	5950	Woodbine	247-5942
57-11	SPENCE - Dailey #1	6392	Woodbine	857-6392
58-1	NEVADA OIL - Jones G.U. #1	5898	Woodbine	No Data
58-2	HUMPHREY - Brown #1	6276	Woodbine	252-5949
58-3	BASIN OPER. - Herod et. al. #1	11192	Travis Peak	345-11192
58-4	LONE STAR - Newman #1	5935	Woodbine	675-5935
58-5	PURE - Pennington #1	6245	Woodbine	646-6240
59-1	LONE STAR - Peterson #1	5900	Woodbine	112-5724
59-2	MARINO - Smith #1	5858	Woodbine	270-5853
59-3	LONE STAR - Shows #1	5800	Woodbine	112-5744
60-1	BASIN - White #1	5800	Woodbine	212-5796
60-3	LONE STAR - Duncan #2	5808	Woodbine	300-5806
60-5	ROBERTS ET. AL. - Brown #1	5856	Woodbine	194-5852
60-6	SUPERIOR - Brown #1	6611	Washita	707-6610
60-7	LONE STAR - Porter #1	5900	Woodbine	107-5844
60-8	CORLEY - Thomason	6262	Woodbine	377-6257
62-1	JOYCE - Patton #1	6845	Washita	300-6837
63-4	EXXON - Reid #1	8600	Trinity	No Data
63-5	PHILLIPS - Taylor F.C. #1	5983	Woodbine	220-5983
64-1	HUMPHREY - Fox #1	6212	Woodbine	205-6206

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EAST TEXAS STUDY AREA

APPENDIX A-5

BRINE DISPOSAL WELLS

The locations, injection intervals, and injection rates of disposal wells operating within the study area were identified to estimate the potential effects of brine disposal on ground-water hydraulics and water chemistry in the vicinity of those wells used to provide hydrologic data for the Area Characterization reports. Brine disposal data were obtained from the Texas Railroad Commission for wells operating in 1978, 1979, and 1980.

A total of 193 injection wells were identified in the study area. The largest concentration of these wells is located in southeastern Anderson County. Injection is generally into the beds of the Wilcox and Woodbine Groups and the Carrizo Formation. Approximately 60 percent of the injection wells return fluids to the same formation from which they were withdrawn. Figure A-5.1 shows the general location of injection wells in the study area. Table A-5.1 summarizes the locations and injection rates of wells for which data are available. Forty-five of the disposal wells listed in the table are located outside of the study area and are not shown in Figure A-5.1.

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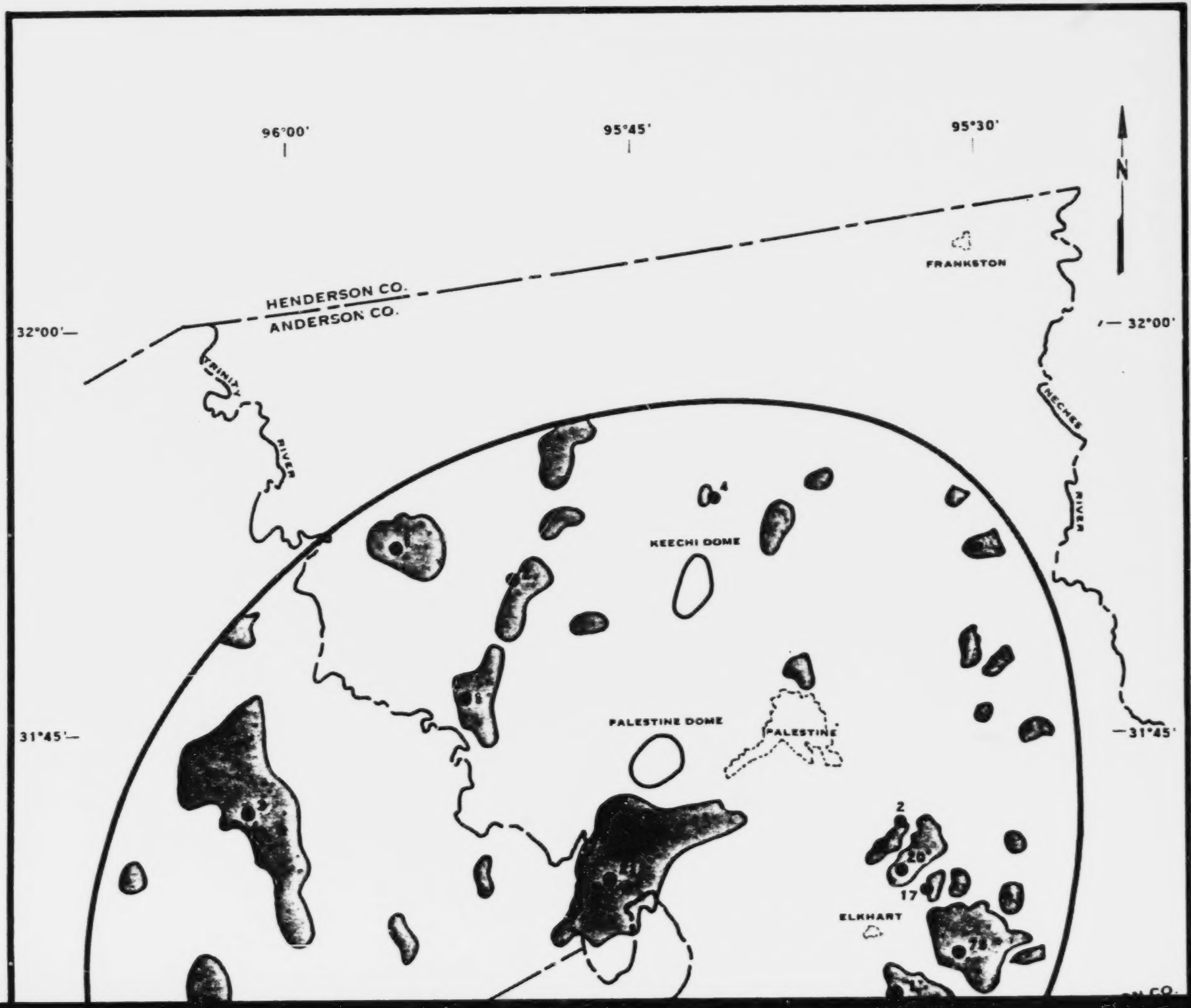

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LEGEND

OIL AND GAS FIELDS

1 DISPOSAL WELL NUMERAL INDICATES NUMBER OF WELLS IF MORE THAN ONE WELL

SALT DOME SHOWING LOCATION OF -2000 FT. MSL CONTOUR ON SALT SURFACE

5 0 5 MILES

8 4 0 8 KILOMETERS

PREPARED		DATE	
REVISED		DATE	
REVISED		DATE	
APPROVED		DATE	

T-1421-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY
MARIETTA, GEORGIA

EAST TEXAS STUDY AREA
APPENDIX A-5
LOCATION MAP OF BRINE DISPOSAL WELLS

JOB NO. MV9600 FIGURE A-5.1

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 1 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Bi-Stone Fuel Wildcat-Bethel Area #1	Anderson	6000-6200	N.A.	9,125,000	To be Drilled
Texas, Inc. Bethel	Anderson	5650-6200	N.A.	365,000	Redrilled for SWD
Texaco, Inc Bethel	Anderson	4775-6100	Woodbine	255,000 1,095,000	N.A.
Burk Royalty Boggy Creek	Anderson	3740-3760	Woodbine	36,500	New Project
Camp Hill Oil Camp Hill	Anderson	420-438	Carrizo	219,000/ well	(two wells)
Kimball Prod. Camp Hill	Anderson	422-448	Wilcox-Carrizo	2,190,000	N.A.
Kimball Prod. Camp Hill	Anderson	534-557	Wilcox-Carrizo	2,190,000	N.A.
Kimball Prod. Camp Hill	Anderson	518-543	Wilcox-Carrizo	2,190,000	N.A.
Kimball Prod. Camp Hill	Anderson	772-756	Wilcox-Carrizo	2,190,000	N.A.
Tenneco Oil Camp Hill	Anderson	358-367	Carrizo	730,000	N.A.
Tenneco Oil Camp Hill	Anderson	355-372	Carrizo	730,000	N.A.
Tenneco Oil Camp Hill	Anderson	464-487	Carrizo	730,000	N.A.
Teneco Oil Camp Hill	Anderson	505-521	Carrizo	730,000	N.A.

T-1691A-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 2 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Tenneco Oil Camp Hill	Anderson	420-430	Carrizo	730,000	N.A.
Tenneco Oil Camp Hill	Anderson	418-438	Carrizo	730,000	N.A.
Amer. Petrofina Cayuga	Anderson	4056-4063	N.A.	109,500-547,500	N.A.
Dbl Diamond Cayuga	Anderson	4036-4060	Woodbine	73,000-219,000	N.A.
Getty Oil Cayuga	Anderson	3850-3902	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3860-3865	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3866-3984	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3883-4086	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3870-3888	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3894-4260	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3866-4079	Woodbine	1,825,000	N.A.
Getty Oil Cayuga	Anderson	3974-4090	Woodbine	1,825,000	N.A.
Sabio O & G Cayuga	Anderson	4025-4232	Woodbine	1,095,000	Approved Jan. 1970

T-1691B-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 3 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Sabio O & G Cayuga	Anderson	4060-4110	N.A.	547,500- 912,500	Temp. Stand by
Jack Hailey Concord Dome	Anderson	4450-	Woodbine	12,045	New Project
Humble Oil Concord Dome	Anderson	4026-4041	Woodbine	73,000- 219,000	N.A.
Morgan Bros. Concord Dome	Anderson	4627-4639	Woodbine	292,000	N.A.
W.H. Bryand Lake Mary	Anderson	5574-5577	Woodbine	18,250	N.A.
Topaz Oil Co. Lake Mary	Anderson	5491-5520	Woodbine	3,650- 73,000	N.A.
Carter-Gragg Long Lake	Anderson	5510-5520	Lower Woodbine	127,750- 219,000	N.A.
Dbl Diamond Long Lake	Anderson	5371-5381	Woodbine	1,460,000- 2,190,000	N.A.
Getty Oil Long Lake	Anderson	4936-5332	Woodbine	1,290,000	N.A.
Getty Oil Long Lake	Anderson	5232-5472	Woodbine	2,190,000	N.A.
Getty Oil Long Lake	Anderson	5128-5218	Woodbine	2,007,500	N.A.
Getty Oil Long Lake	Anderson	5131-5161	Woodbine	2,007,500	N.A.
Getty Oil Long Lake	Anderson	5143-5294	Woodbine	2,007,500	N.A.

T-1691C-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 4 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Getty Oil Long Lake	Anderson	5156-5208	Woodbine	2,007,500	N.A.
Getty Oil Long Lake	Anderson	5140-5330	Woodbine	2,190,000	N.A.
Hunt Oil Co. Long Lake	Anderson	5380-5392	Woodbine	1,825,000	N.A.
Hunt Oil Co. Long Lake	Anderson	5214-5226	N.A.	109,000	N.A.
Hunt Oil Co. Long Lake	Anderson	5262-5270	Woodbine	182,500	N.A.
Mobil Oil Co. Long Lake	Anderson	5298	Woodbine	1,825,000	N.A.
Socony Mobil Long Lake	Anderson	5260	Woodbine	547,500	N.A.
Stroube & Stroube Long Lake	Anderson	5300-5400	N.A.	182,000- 273,750	N.A.
Stroube & Stroube Long Lake	Anderson	5250-5700	N.A.	547,500 730,000	N.A.
Texaco, Inc. Long Lake	Anderson	5275-5300	Woodbine	1,095,000	N.A.
Texaco, Inc. Long Lake	Anderson	5200-5250	Woodbine	1,095,000	N.A.
Texaco, Inc. Long Lake	Anderson	5250-5400	Woodbine	1,095,000	N.A.
Exxon Corp. Neches	Anderson	5007-5352	Woodbine	365,000 2,555,000	N.A.

T-1691D-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 5 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Humble Oil Neches	Anderson	4900-5370	Woodbine	1,825,000	Cancelled
Loyce & Phill. Neches North	Anderson	4894-4910	Sub- Clarksville	109,500- 365,000	N.A.
Hinton Prod. Prairie Lake	Anderson	8874-8882	Upper Rodessa	18,250 73,000	N.A.
Eng. Jackson Salmon, South	Anderson	6116-6158	Woodbine	N.A.	Cancelled
Shell Oil Co. Slocum	Anderson	527-555	Carrizo	547,500	N.A.
Shell Oil Co. Slocum	Anderson	471-605	Carrizo	547,500	N.A.
Shell Oil Co. Slocum	Anderson	539-571	Carrizo	547,500	N.A.
Shell Oil Co. Slocum	Anderson	509-535	Carrizo	547,500	N.A.
Shell Oil Co. Slocum	Anderson	552-584	Carrizo	547,500	N.A.
Shell Oil Co. Slocum	Anderson	582	Carrizo	219,000	N.A.
Shell Oil Co. Slocum	Anderson	580	Carrizo	219,000	N.A.
Shell Oil Co. Slocum	Anderson	580	Carrizo	219,000	N.A.
Shell Oil Co. Slocum	Anderson	580	Carrizo	219,000	N.A.

T-1691E-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 6 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Shell Oil Co. Slocum	Anderson	580	Carrizo	219,000	N.A.
Shell Oil Co. Slocum	Anderson	580	Carrizo	219,000	N.A.
Shell Oil Co. Slocum	Anderson	527-585	Carrizo	N.A.	N.A.
Tenneco Oil Slocum	Anderson	530-560	Carrizo	730,000	N.A.
Tenneco Oil Slocum	Anderson	556-585	Carrizo	730,000	N.A.
Tenneco Oil Slocum	Anderson	543-577	Carrizo	730,000	N.A.
Tenneco Oil Slocum	Anderson	548-575	Carrizo	730,000	N.A.
Tenneco Oil Slocum	Anderson	553-579	Carrizo	730,000	N.A.
Tenneco Oil Slocum	Anderson	536-562	Carrizo	730,000	N.A.
Tenneco Oil Slocum	Anderson	572-604	Carrizo	547,500	N.A.
Tenneco Oil Slocum	Anderson	564-596	Carrizo	547,500	N.A.
Tenneco Oil	Anderson	555-584	Carrizo	547,500	N.A.
Texaco, Inc. Slocum	Anderson	631-675	Carrizo	1,095,000	N.A.

T-1691F-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 7 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Texaco, Inc. Slocum	Anderson	550-570	Carrizo	1,095,000	N.A.
Texaco, Inc. Slocum	Anderson	551-580	Carrizo	1,095,000	N.A.
Texaco, Inc. Slocum	Anderson	5645-5710	Woodbine	54,750	N.A.
Amity Oil Co. Slocum, NW	Anderson	5819-5825	Woodbine	127,750	N.A.
Copeland Well Slocum, NW	Anderson	5280-5288	Woodbine	18,250-146,000	N.A.
Placid Oil Slocum, NW	Anderson	5755-5837	Woodbine	365,000	N.A.
Shell Oil Slocum, NW	Anderson	670-810	Carrizo	10,950,000	N.A.
Shell Oil Slocum, NW	Anderson	510-580	Carrizo	730,000	N.A.
Shell Oil Slocum, NW	Anderson	5500-5539	N.A.	182,000-365,000	N.A.
Shell Oil Slocum	Anderson	5590-5610	Woodbine	182,000-365,000	N.A.
Shell Oil Slocum, NW	Anderson	503-620	Carrizo	16,425	N.A.
Shell Oil Slocum, NW	Anderson	665-715	Carrizo	16,425	N.A.
Shell Oil Slocum, NW	Anderson	590-720	Carrizo	16,425	N.A.

T-1691G-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 8 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Shell Oil Slocum, NW	Anderson	502-552	Carrizo	16,425	N.A.
Dbl Diamond Petro.Slocum	Anderson	5651-5659	Sub-Clarksville	146,000	N.A.
Dbl Diamond Petro.Slocum	Anderson	5707-5710	Sub-Clarksville	73,000	N.A.
Thos. Humphrey Slocum, South	Anderson	5980-6200	Woodbine	164,250	N.A.
Atlantic Rich. Slocum, West	Anderson	5775-5800	Woodbine	N.A.	Cancelled
Texaco, Inc. Slocum, West	Anderson	5666-5671	Woodbine	109,000	New Project
Cities Serv. Tenn. Colony	Anderson	5150-5480	N.A.	7,300-18,250	
Sabio O & G Tenn. Colony	Anderson	4900-5750	N.A.	3,650 54,750	N.A.
Bay-Tech Operating Co. Slocum, West	Anderson	5716-5755	N.A.	92,000-183,000	N.A.
Taylor Operating Co. Slocum, West	Anderson	5830-5844	N.A.	73,000-183,000	N.A.
Hunt Oil Co. Fairway	Anderson	5450-5650	N.A.	183,000-3,650,000	N.A.
Sabio Oil & Gas Cayuga	Anderson	4204-4234	N.A.	1,095,000-1,680,000	Approved Jan. 1970
Sabio Oil & Gas Cayuga	Anderson	4060-4110	N.A.	548,000-913,000	Temporary Stand-by well

T-1691H-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 9 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Double Diamond Petro. Cayuga	Anderson	4036-4060	N.A.	73,000-219,000	Approved April, 1965
Exxon Neches	Anderson	5007-5352	N.A.	365,000-2,550,000	N.A.
Hunt Oil	Anderson	5214-5226	N.A.	73,000 183,000	N.A.
Colorado Oil Boggy Creek	Cherokee	3606-3750	N.A.	1,460,000	N.A.
Humble Oil Neches	Cherokee	5200-5350	N.A.	1,825,000	N.A.
James E. Kemp Cayuga	Freestone	4200-4750	Woodbine	1,825,000	N.A.
Carter-Gragg Long Lake	Freestone	5212-5248	N.A.	109,500-182,500	N.A.
Latimer '73 Red Lake	Freestone	4540	Sub-Clarksville	365,000	N.A.
Texaco, Inc. Reed	Freestone	4280-4360	Woodbine	73,000	N.A.
Getty Oil Co. Rischers's Store	Freestone	3650-4070	Woodbine	9,125 49,275	New Well
Getty Oil Co. Teas	Freestone	3760-4070	Woodbine	9,125 73,000	Aband. Well
Petro-Management Freestone	Freestone	4720-4930	N.A.	365,000-1,095,000	Gravity Injection only

T-1691I-0

EAST TEXAS STUDY AREA

APPENDIX A-5

TABLE A-5.1 (Page 10 of 10)

SUMMARY OF DISPOSAL WELLS IN THE
EAST TEXAS STUDY AREA AND VICINITY

OWNER/FIELD	COUNTY	DISPOSAL DEPTH (FEET)	FORMATION OR GROUP SCREENED	AMOUNTS DISPOSED (BARRELS/YR)	STATUS[1]
Amoco Running Duke	Houst	5968-6516	N.A.	0- 365,000	N.A.
Petro Dynamics Buffalo	Leon	5500-5560	Woodbine	547,500	N.A.
Ridley & Lock. Buffalo	Leon	5710-5860	Woodbine	912,500	N.A.
Macdonald Oil Leona	Leon	7134-7140	Sub- Clarksville	182,500	N.A.
Carter-Jones Oakwood Dome	Leon	1271-1280	Woodbine	36,500- 73,000	N.A.
W.R. Hughey Oakwood Dome	Leon	1260-1268	Woodbine	109,000- 182,500	N.A.
Texaco, Inc. Oakwood Dome	Leon	6150-6360	N.A.	584,000	N.A.
Abadou Oil SW Oakwood	Leon	5860-	Woodbine	109,500	New Project

1 N.A. indicates data is not available

T-1691J-0

APPENDIX B

Sample Analyses

EAST TEXAS STUDY AREA

APPENDIX B

SAMPLE ANALYSES

The studies undertaken for the geologic characterization of the East Texas Study Area did not include paleontological, heavy mineral, grain-size, or clay mineral analyses. The large amount of geological data generated by the petroleum industry, which was available for this study, was considered sufficient to characterize the stratigraphy of both subsurface and outcropping sediments.

APPENDIX C

Ground Water

EAST TEXAS STUDY AREA

APPENDIX C-1

AQUIFER FIELD TEST METHODS

A basic objective of ground-water studies in the East Texas Study Area was to determine the availability, occurrence, movement, and chemistry of ground water in the study area. Quantitative knowledge of aquifer characteristics such as storage, transmissivity, and hydraulic conductivity (see Glossary in any Area Characterization volume for definition of terms) provides the basis upon which the occurrence and movement of ground water are determined. By combining these characteristics with water level, water chemistry, and lithologic data, a description of the ground-water flow system can be made.

Six deep wells were drilled during field investigations for Area Characterization in the East Texas Study Area (Table C-1.1). These wells were used for aquifer testing. The wells were constructed as shown in Figure C-1.1.

Five wells were pumped to determine aquifer characteristics and one well was used as an observation well in conjunction with one of the pumping wells. Aquifer tests were performed by pumping a well at a constant rate for a specified time period and concurrently observing water-level changes. Water levels also were monitored for a period of time after pumping stopped. The data from the pumped wells were analyzed for transmissivity and hydraulic conductivity (see Table C-1-2) by using the modified

Theis nonequilibrium formula and the Theis recovery formula (Ferris and others, 1962) (Law Engineering, 1981a,b,c). Interference drawdowns in Observation Well TOH-2DO during pumping of Well TOH-2D2 were used to determine the storage coefficient for the Carrizo Formation in the vicinity of the well site. The storage coefficient was computed to be 0.0002.

Prior to aquifer testing, all wells were developed to remove remnant drilling fluids from the formation around the borehole and fine-grained material around the well screen. Well development normally was completed after a period of from 12 to 24 hours. A step-drawdown test was then run to determine the discharge rates to be used for a 24-hour aquifer test.

Problems associated with aquifer testing and analyses were related to equipment malfunction and to varying aquifer and water chemistry characteristics. In some tests, changing temperatures and salinities, and the presence of gaseous hydrocarbons during testing caused the pattern of test results to deviate from normal. In these cases, the values of the aquifer parameters derived from the tests have a level of uncertainty associated with them which is greater than normal. To reduce the uncertainty the aquifer-test data selected for analysis were from those periods during which notable changes in temperature, salinity, and concentration of gas were not occurring. Results of the Law Engineering analyses agree with regional trends established by published data. This suggests that the assumptions are reasonable.

APPENDIX C-1

REFERENCES

Ferris, J. G.; Knowles, D. B.; Brown, R. H.; and Stallman, R. W.; 1962, Theory, of aquifer tests: U.S. Geological Survey Water-Supply Paper 1536-E, 174 p.

Law Engineering Testing Company, Inc. (a), 1981, Well completion report DOE-Settlemyre site TOG-1: Marietta, GA.

Law Engineering Testing Company, Inc. (b), 1981, Well completion report DOE-Settlemyre site TOH-2: Marietta, GA.

Law Engineering Testing Company, Inc. (c), 1981, Well completion report DOE-Settlemyre site TOH-5: Marietta, GA.

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EAST TEXAS STUDY AREA
APPENDIX C-1
TABLE C-1.1
AQUIFER TEST WELL CONSTRUCTION SUMMARY

WELL	GROUND SURFACE ELEVATION (FT. ABOVE MSL)	CASING LENGTH (FT.)	NOMINAL CASING DIAMETER (IN.)	APPROXIMATE ELEVATION TOP OF SCREEN (FT. ABOVE MSL)	SCREEN LENGTH (FT.)	NOMINAL SCREEN DIAMETER (IN.)	GEOLOGIC UNIT SCREENED
TOG-1WS	360	101	6.625	259	61	3.500	CARRIZO FORMATION
TOH-5D	423	473	6.625	-50	101	3.500	CARRIZO FORMATION
TOH-2D2	374	516	6.625	-142	61	3.500	CARRIZO FORMATION
TOH-2DQ	374	519	6.625	-145	41	3.500	CARRIZO FORMATION
TOH-2AO	375	825	6.625	-482	102	3.500	UPPER WILCOX GROUP
TOH-2A	375	1895	6.625	-1529	19	3.500	LOWER WILCOX GROUP

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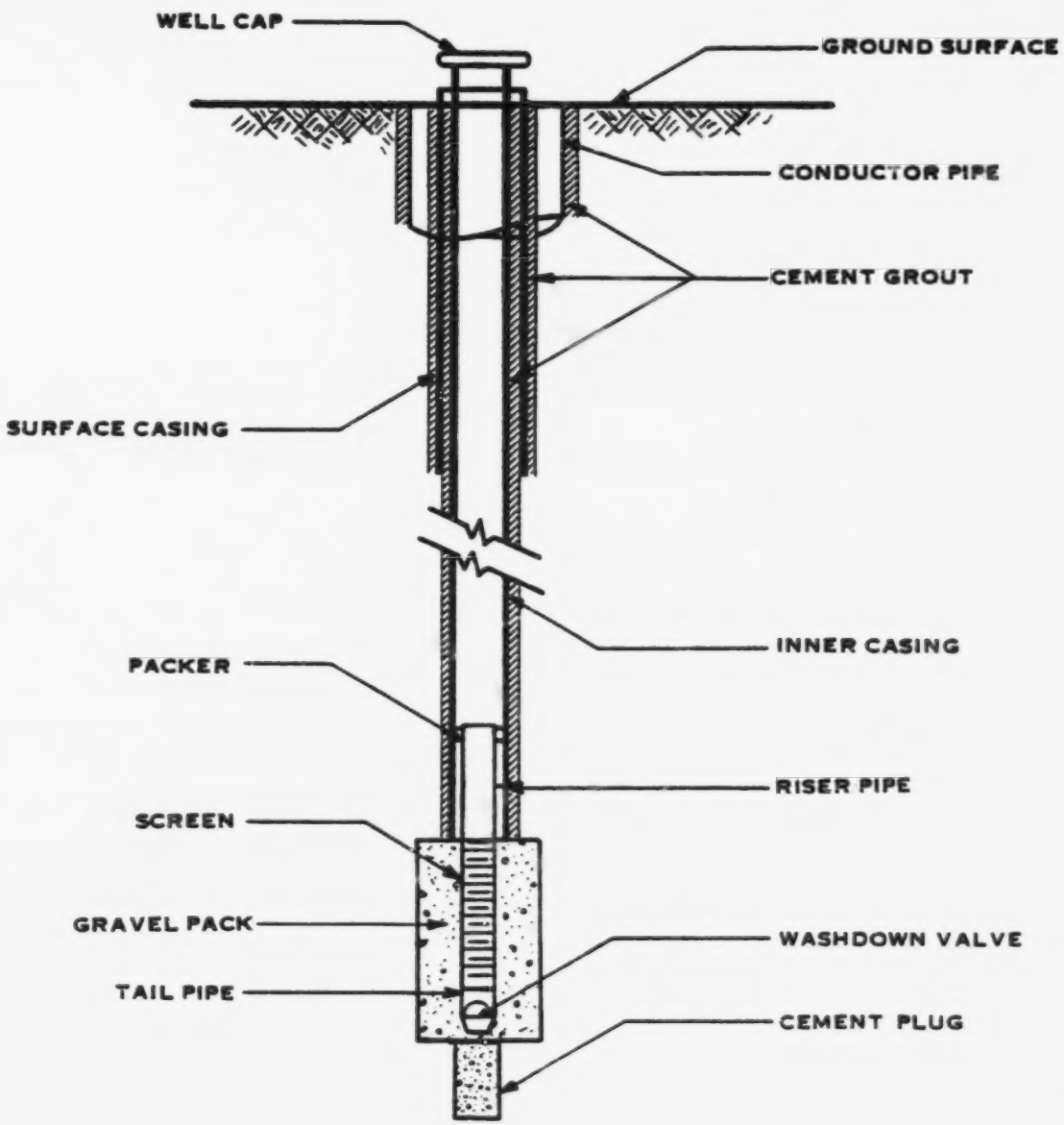

NOT TO SCALE

PREPARED J.D.G. DATE 12/22/80 REVISED ——— DATE ——— REVISED ——— DATE ——— APPROVED GHE DATE 12/22/80 T-1493-2	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	EAST TEXAS STUDY AREA APPENDIX C-1 TYPICAL WELL CONSTRUCTION JOB NO. MV9700 FIGURE C-1.1

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EAST TEXAS STUDY AREA

APPENDIX C-1

TABLE C-1-2

SUMMARY OF AQUIFER SYSTEM PROPERTIES IN THE TEXAS STUDY AREA

SITE NO	WELL	DATE OF TEST	AQUIFER SCREEN	DEPTH TO WATER PRIOR TO PUMPING (FT)	DEPTH TO WATER AT END OF TEST (FT)	PUMPING RATE (FT^3/SEC)	MAXIMUM FLUID TEMPERATURE OF PUMP DISCHARGE (°C)	TRANSMISSIVITY (FT^2/DAY)	HYDRAULIC CONDUCTIVITY (FT/DAY)	METHOD OF ANALYSIS (DATA FROM ANALYSIS OF WATER LEVELS IN PUMPED WELL UNLESS OTHERWISE NOTED NOTICED)
TOG-1	1WS	NOV 15-16 1979	CARRIZO FORMATION	60.81	62.62	1.03×10^{-1}		150	1.7	THEIS MODIFIED NON-EQUILIBRIUM
								140	1.6	JACOB RECOVERY
TOH-2	2A	JAN 29 TO FEB 1 1980	LOWER WILCOX FORMATION	88.19	108.46	6.5×10^{-2}	34.1	17	0.7	THEIS MODIFIED NON-EQUILIBRIUM
								15	0.6	JACOB RECOVERY
	2AO	JAN 24-25 1980	UPPER WILCOX FORMATION	93.80	103.35	6.7×10^{-1}	27.0	1800	16	THEIS MODIFIED NON-EQUILIBRIUM
								1500	13	JACOB RECOVERY
	2D2	FEB 7-8 1980	CARRIZO FORMATION	97.36	98.02	7.0×10^{-1}	24.0	2000	29	THEIS MODIFIED NON-EQUILIBRIUM
								1500	22	JACOB RECOVERY
TOH-5	5D	NOV 2-3 1979	CARRIZO FORMATION	145.31	146.98	6.2×10^{-1}		2500	21	THEIS MODIFIED NON-EQUILIBRIUM
								3100	26	JACOB RECOVERY

EAST TEXAS STUDY AREA

APPENDIX C-2

WATER LEVEL MONITORING

Water level readings are used to determine aquifer potentiometric levels and to determine aquifer response to recharge and discharge.

Water levels were monitored periodically by LETCo personnel using an electric tape measuring device. The electric tape consists of an insulated electric wire with a probe on one end and an ohmmeter on the other. Tables C-2.1 through C-2.6 give basic data about each Area Characterization well and the measured elevations of the water level referenced to mean sea level (MSL). The water levels presented are those taken after well development and aquifer testing.

EAST TEXAS STUDY AREA

TABLE C-2.1

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SETTLEMYRE TOG-1WS

WATER LEVEL MEASURED --- Screened in Carrizo Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding and steel-tape measurements. Measuring point: variable prior to 3/4/80. Measuring point as of 3/4/80: top of locking cap on top of 6-in.* steel casing collar, 3.5 ft.** above ground surface. Ground surface is 360.0 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
7/21/79	303.5	11/26/79	303.4	2/11/80	303.6
11/12/79	302.6	12/03/79	304.5	2/19/80	303.8
11/13/79	302.6	2/05/80	303.5	3/04/80	304.3
11/15/79	302.4				

*To convert to millimeters, multiply by 25.4.
**To convert to meters, multiply by 0.3048.

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EAST TEXAS STUDY AREA

TABLE C-2.2

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SETTLEMYRE TOH-2A

WATER LEVEL MEASURED --- Screened in Lower Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding and steel-tape measurements. Measuring point: variable prior to 2/25/80. Measuring point as of 2/25/80: top of locking cap on top of 6-in.* steel casing collar, 2.9 ft.** above ground surface. Ground surface is 360.0 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
10/02/79	305.0	12/17/79	304.9	1/15/80	305.0
10/07/79	305.0	12/27/79	305.2	1/16/80	303.5
12/03/79	305.1	1/02/80	305.3	2/19/80	299.7
12/10/79	305.4	1/10/80	305.2	2/25/80	300.7
12/14/79	305.3	1/14/80	305.0	3/04/80	302.2

*To convert to millimeters, multiply by 25.4.
**To convert to meters, multiply by 0.3048.

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EAST TEXAS STUDY AREA

TABLE C-2.3

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SETTLEMYRE TOH-2AO

WATER LEVEL MEASURED --- Screened in Upper Wilcox Group (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding and steel-tape measurements. Measuring point: variable prior to 3/4/80. Measuring point as of 3/4/80: top of locking cap on top of 6-in.* steel casing collar, 3.0 ft.** above ground surface. Ground surface is 374.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
1/13/80	285.1	1/16/80	284.8	2/04/80	280.4
1/14/80	285.0	1/18/80	283.4	2/25/80	284.2
1/15/80	284.9	1/24/80	283.8	3/04/80	285.3

*To convert to millimeters, multiply by 25.4.
**To convert to meters, multiply by 0.3048.

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EAST TEXAS STUDY AREA

TABLE C-2.4

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SETTLEMYRE TOH-2DO

WATER LEVEL MEASURED --- Screened in Carrizo Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding and steel-tape measurements. Measuring point: top of 6-in.* steel casing collar, 2.3 ft.** above ground surface. Measuring point as of 2/19/80: top of locking cap on top of 6-in. steel casing collar, 2.8 ft. above ground surface. Ground surface is 374.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/20/79	281.3	12/20/79	281.3	1/16/80	281.6
11/03/79	280.5	12/27/79	280.8	1/16/80	281.6
11/04/79	280.6	1/10/80	281.6	2/19/80	281.9
12/14/79	280.4	1/15/80	281.6	3/04/80	282.0
12/17/79	280.9				

*To convert to millimeters, multiply by 25.4.
**To convert to meters, multiply by 0.3048.

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EAST TEXAS STUDY AREA

TABLE C-2.5

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SETTLEMYRE TOH-2D2

WATER LEVEL MEASURED --- Screened in Carrizo Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Periodic electric-sounding and steel-tape measurements. Measuring point: top of 6-in.* steel casing collar, 3.0 ft.** above ground surface. Measuring point as of 2/6/80: top of locking cap on top of 6-in. steel casing collar, 4.2 ft. above ground surface. Ground surface is 374.6 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
9/20/79	282.0	1/16/80	281.9	2/16/80	281.6
2/07/80	281.4				

*To convert to millimeters, multiply by 25.4.
**To convert to meters, multiply by 0.3048.

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EAST TEXAS STUDY AREA

TABLE C-2.6

WATER LEVEL MEASUREMENTS

WELL NAME --- DOE SETTLEMYRE TOH-5D

WATER LEVEL MEASURED --- Screened in Carrizo Formation (See Figure A-4.1 and Table C-1.1 for well location and well construction details).

MEASUREMENTS --- Steel tape measurements. Measuring point: variable to 12/20/79. Measuring point as of 12/20/79: top of locking cap on top of 6-in.* steel casing collar, 2.7 ft.** above ground surface. Ground surface is 423.7 ft. MSL.

WATER LEVEL ELEVATION, IN FEET MSL

DATE	ELEVATION	DATE	ELEVATION	DATE	ELEVATION
10/17/79	282.4	12/03/79	281.4	1/17/80	281.4
10/29/79	281.6	12/10/79	281.6	1/24/80	281.4
10/31/79	281.5	12/17/79	281.3	1/31/80	281.1
11/01/79	280.8	12/20/79	281.0	2/11/80	281.1
11/02/79	281.1	12/27/79	281.1	2/19/80	281.2
11/06/79	280.9	1/03/80	281.1	2/25/80	281.6
11/26/79	281.6	1/10/80	281.2	3/04/80	281.2

*To convert to millimeters, multiply by 25.4.
**To convert to meters, multiply by 0.3048.

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EAST TEXAS STUDY AREA

APPENDIX C-3

WATER SAMPLING TECHNIQUES

Water samples were collected from wells during aquifer testing following procedures which included nitrogen-vacuum filtration. This method of sample collection is shown schematically in Figure C-3.1. Samples were placed in plastic containers that had been rinsed with acid and distilled water. Acid was added to the samples as appropriate for preservation. Samples to be analyzed for dissolved metals were filtered on site by using 0.45-micron filters and by either peristaltic or pressure filtration techniques.

The following list summarizes chemical parameters analyzed from the water samples.

CHEMICAL PARAMETERS

Aluminum, dissolved
Cadmium, dissolved
Chromium, dissolved
Cobalt, dissolved
Copper, total & dissolved
Lead, total & dissolved
Lithium, total
Zinc, dissolved
Strontium, dissolved
Boron
Nitrate
Sulfate
Phosphorus, total
Iodide

Chloride
Bromide
Carbonate
Bicarbonate
Hydroxide
Silica as SiO_2
Total dissolved solids
Total solids
Suspended solids
Density
Alkalinity
Hardness
Temperature (C)
pH (standard units)
Conductivity (mmho/cm)

The methodologies employed in the analyses for these parameters are those described by Franson (1971) and the U.S. Environmental Protection Agency (1971).

In order to observe any major differences in water chemistry between the initial and terminal phases during aquifer testing, samples were collected at 6 and 24-hour intervals in selected wells. Water from most wells underwent some chemical change during the period of testing.

Field measurement of temperature, pH, conductivity, and oxidation-reduction potential was performed coincidentally with aquifer testing. A variety of instruments was used to measure these parameters, including Hydrolab TC-2, Hydrolab 4000 and Hydrolab 8000 systems, and an Orion Specific Ion pH Meter. All instruments were calibrated according to manufacturers' specifications and at time intervals adequate to assure proper field function.

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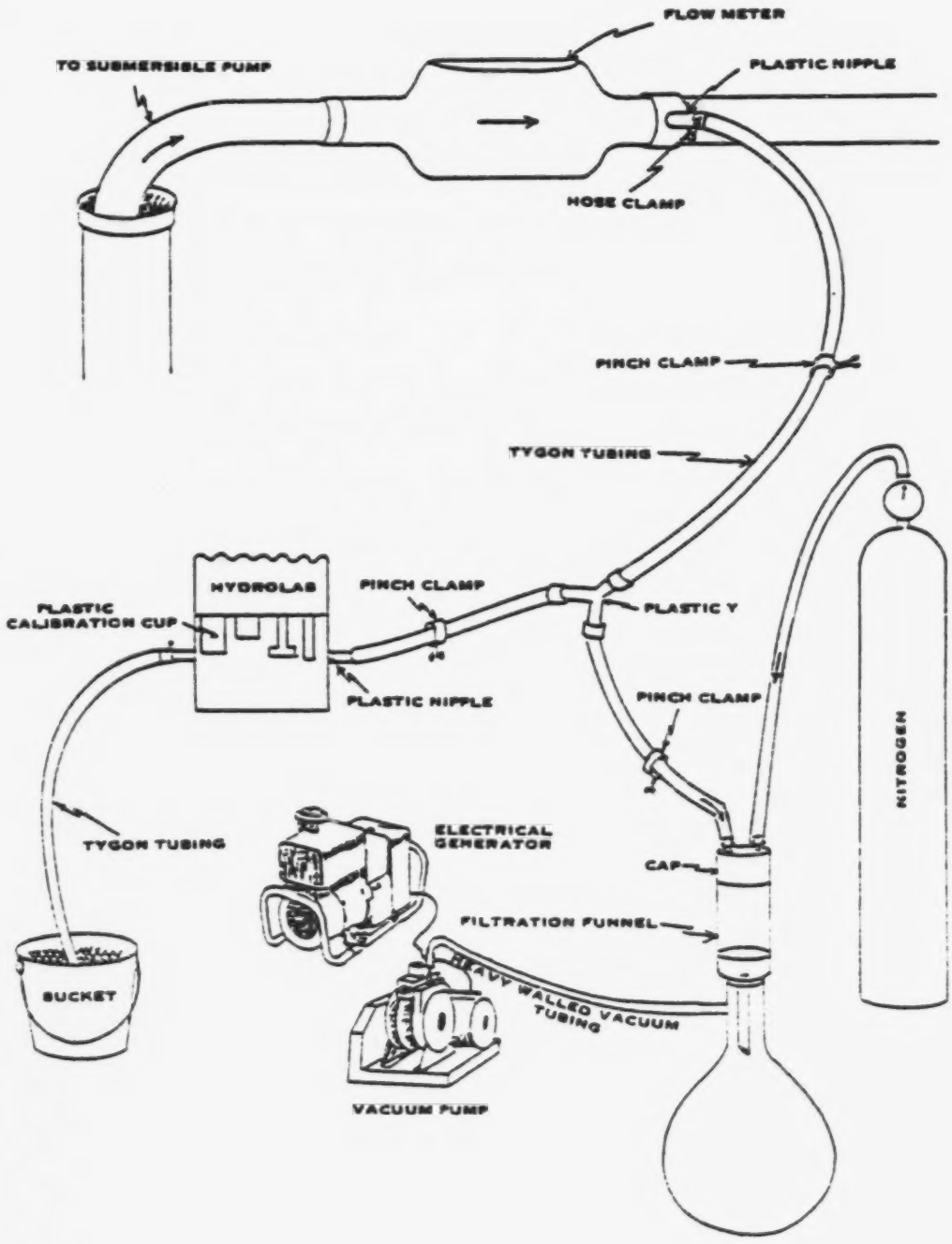

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PREPARED ____ DATE ____ REVISED ____ DATE ____ REVISED ____ DATE ____ APPROVED ____ DATE ____ T-1188-2	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	EAST TEXAS STUDY AREA APPENDIX C-3 INITIAL WATER QUALITY APPARATUS FOR SAMPLING UNDER ANAEROBIC CONDITIONS JOB NO. MV9700 FIGURE C-3.1

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APPENDIX C-3

REFERENCES

Franson, Mary A., ed., 1971, Standard methods for the examination of water and wastewater, 13th edition: American Public Health Association, Washington, D.C.

U.S. Environmental Protection Agency, 1971, Methods for chemical analysis of water and wastes: Cincinnati, Ohio, USEPA.

EAST TEXAS STUDY AREA

APPENDIX C-4

FLOOD PLAIN DELINEATION

OAKWOOD DOME

Since backwater effects from Buffalo Creek would not extend to the site, probable maximum precipitation (PMP) needed to be determined only for the Alligator Creek and Mustang Creek sub-watersheds. The drainage areas of these watersheds are 29.5 km^2 (11.4 mi^2) and 19.4 km^2 (7.5 mi^2), respectively. A design storm of 6 hours was chosen for these watersheds. Values of PMP for 30 and 518 km^2 (10 and 200 mi^2) were taken from Schneider and Riedel (1978). The PMP for the watersheds was determined to be 775 mm (30.5 in.) by semi-logarithmic interpolation. Typical PMP details such as storm configuration, maximization procedures, time distribution, orographic effects, storm centering, seasonal effects, and antecedent storm sequences were not analyzed separately.

The hydrologic response characteristics needed to be identified included the absorption capability of the watersheds and times of concentration for sub-watersheds. The absorption capability of the watersheds was estimated by applying the SCS Soil Curve Number. A design value of 80 was chosen as a conservative estimate for pasture, meadow, and forest land. The initial soil condition was assumed to be saturated. Times of concentration were calculated using standard methods (SCS, 1975). Sixteen cross sections were selected on Mustang Creek and thirty cross

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sections on Alligator Creek and its unnamed tributary for use in the computations. Incremental drainage areas and floodplain lengths between cross sections were measured from USGS 7.5-minute quadrangle maps. Each cross section was rated at incremental elevations for cross-sectional area and discharge, assuming constant slope between 3-meter (10-ft) contours and solving the Chezy-Manning Equation for uniform flow:

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

where: Q = discharge, in units of length cubed per unit time

n = Manning's "n", (roughness coefficient)

A = cross-sectional area, in units of length squared

R = hydraulic radius, in units of length

S = energy gradeline slope, in units of length per unit length (assumed equal to stream bed slope).

A conservative value of 0.1 was assumed for Manning's "n" in the computations.

Cross sections were input to the SCS TR-20 Flood-Routing Computer Program for computation of peak discharges (SCS, 1965). Runoff hydrographs were computed at each section based on the PMP and estimated hydrologic response characteristics of the watershed. Resultant hydrographs were routed downstream and added together using the SCS Convex Routing Method and flood plain lengths. The hydrograph at each section was output with discharge and elevations at 0.2-hour intervals.

The stream backwater profile for the probable maximum flood (PMF) was computed by using the U.S. Army Corps of Engineers

(COE) HEC-2 Surface Water Profile Program (COE, 1976). This method applied Bernoulli's Theorem and Manning's Frictional Loss Equation to solve for the total energy at each cross section.

Cross sections were input to HEC-2 for each stream reach, along with peak discharges derived using TR-20 to compute flood profiles. These discharges were assumed to be steady-state discharges at each cross section. The program generated flood elevations at each cross section by using the input data. The area inundated by the PMF was determined by interpolating between cross sections.

KEECHI DOME

Since the Trinity River was found to be too far downstream from the dome site to cause backwater effects, the flood analysis was limited to that portion of Keechi Creek watershed upstream of the Highway-287 bridge. This location allows for taking into account possible backwater effects due to discharges from Sixmile and Fivemile Branches. The drainage area above the highway bridge is 61.4 km^2 (23.7 mi^2).

The size of the drainage basin and the estimated time of concentration required a value of 24 hours as the design storm duration for the probable maximum precipitation. A longer duration would have little or no effect on the peak discharge since time-to-peak is considerably less than 24 hours. Values of PMP for 30 and 518 km^2 (10 and 200 mi^2) were taken from Schneider and Riedel (1978). The PMP used was 1,079 mm (42.5 in). Typical PMP details such as storm configuration, maximization procedures,

The absorptive capacity of the watershed was estimated through the SCS Soil Curve Number. A design value of 80 was chosen as a conservative estimate for pasture, meadow, and forest. Initial soil condition was assumed to be saturated. There were no other allowances for antecedent precipitation conditions.

The SCS TR-20 Flood-Routing Computer Program was used to develop peak discharges for the PMF at selected cross sections.

The stream backwater profile for the PMF was computed using the COE HEC-2 Surface Water Profile Program. This method applies Bernoulli's Theorem and Manning's Frictional Loss Equation to solve for the total energy at each cross section.

Thirteen cross sections were input to HEC-2, along with the peak discharges derived by using TR-20. These discharges were assumed to be steady-state discharges at each cross section. The model generated flood elevations at each cross section by using the input data. The area inundated by the PMF was determined by interpolating between cross sections.

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EAST TEXAS STUDY AREA

APPENDIX C-4

REFERENCES

Schreider, L. C. and J. T. Riedel; 1978; Probable maximum precipitation estimates, United States east of the 105th meridian; Hydrometeorological Report No. 51, U.S. Department of Commerce, National Oceanic and Atmospheric Administration; U.S. Department of the Army, Corps of Engineers.

Soil Conservation Service, 1975, Urban hydrology for small watersheds: U.S. Department of Agriculture Soil Conservation Service Engineering Division, Technical Release No. 55.

Soil Conservation Service, 1965, Computer program for project formulation, hydrology: Soil Conservation Service Technical Release No. 20, 18 p.

U.S. Army Corps of Engineers, 1976, Generalized computer program HEC-2, water surface profiles: Hydrology Engineering Center, U.S. Army Corps of Engineers, 17 p.

APPENDIX D

Surface Geology

EAST TEXAS STUDY AREA

APPENDIX D-1

REMOTE SENSING

Analyses of lineaments observed on aerial photographs were undertaken by BEG within the East Texas Salt Basin. The study comprised an area of approximately 15,540 km^2 (6,000 mi^2). The scales of the photographs were 1:17,000 and 1:25,000. The East Texas Study Area was partially covered by this analysis (shown in Figure 6-4). The preliminary findings or this study were reported in the Bureau's Quarterly Technical Report dated April 23,1980.

Field checking of linear features at both Oakwood and Keechi Domes was undertaken by BEG to determine the origin and relevance of lineaments detected on aerial photographs. The results of the field checking of 26 linear features in the vicinity of Oakwood Dome and 82 linear features within a 8-km (5-mi) radius around Keechi Dome are presented in the BEG Quarterly Technical Report dated July 14, 1980.

In addition, a study of infrared photography and thermal infrared imagery over Palestine and Grand Saline Domes was undertaken by BEG. The infrared photography studied was at a scale of 1:4,000. The scale of the imagery used in the thermal infrared study was 1:23,000. The findings of these studies were transmitted to LETCo in the form of a copy of a BEG internal memo dated June 26, 1980.

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A list of the purchased Landsat imagery, NASA color infared imagery, U.S. Department of Agriculture low-altitude aerial photographs, USGS aerial photographs and photomosaics, SLAR imagery, and the aerial photographs taken specifically for the Area Characterization study is presented (Table D-1.1).

EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 1 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY

1. Landsat

1 black and white print, band 5, scale 1:250,000
1 black and white print, band 7, scale 1:250,000
1 positive transparency, band 5, scale 1:100,000
1 positive transparency, band 7, scale 1:100,000
1 false color composite, bands 4, 5, 7, scale 1:250,000 of:

Path	Row	Scene	Date
27	37	8239316094500	2/19/76
27	38	8239316100500	2/19/76
28	37	8567315232500	2/20/77
28	38	8567315234500	2/20/77

2. NASA

1 color infrared print, scale 1:120,000 of:

Mission	Roll	Frame
284	1	163-172 187-195
289	1	107-111 113-114
291	4	1-9 27-38 40-49 71-83 111-113
312	7	148-150
	15	54-56

3. USGS Orthophotoquads

11 black and white positive transparencies for stereo-coverage, scale 1:76,000,

5 black and white diazo prints, scale 1:24,000 and

5 mylar positives, scale 1:24,000 of:

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AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Brownsboro NE and SE,
Tennessee Colony SE,
Elkhart NW and
Palestine SW topographic quadrangles

4. United States Department of Agriculture

1 black and white, low-altitude print, 4 miles* radius. each dome, scale 1:20,000 of:

Palestine Dome Vicinity

Mission	Flight line	Frame	Date
CK2	2JJ	112-120 149-155	3/12/69
	6JJ	25-32 119-128 156-164	11/21/68
	7JJ	48	11/24/49
	2F	40-47 60-64 105-116 145-153 199-207	3/22/49

Mt. Sylvan Dome Vicinity

Mission	Flight Line	Frame	Date
CKN	2KK	89-94 123-131 160-169 196-204 237-239	10/29/68
CKO	2FF	2-5 9-15 20-26	11/25/64

T-1700B-0

*To convert to kilometers, multiply by 1.609.

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EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 3 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Mission	Flight Line	Frame	Date
CKS	1KK	18-22 24-29 67-69	11/4/68
	2KK	133-138	12/6/68
CKN	4G	17-22 53-61 142-151 177-185	11/16/50
	9G	21-28 48-55	12/6/50

5. SLAR

1 black and white print and 1 positive transparency of each of the following swaths in the vicinity of Mt. Sylvan:

Flight No.	Pass No.	Scale	Date
665-121	20	1:480,000	5/3/65
953-112	3	1:200,000	10/9/69

6. USGS Panchromatic Photographs

1 black and white, low-altitude print, scale from 1:17,000 to 1:25,000 of:

Mission	Roll	Frame
VBIB	2	47-68; 3-13
	1	225-234; 184-192
VAKW	2	4-27; 53-104; 128-150
	3	59-67; 65-75; 88-109; 195-210 160-175; 127-134; 173-196
	4	3-12; 11-25; 48-63; 63-69

T-1700C-0

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EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 4 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Mission	Roll	Frame
VDTG	1	1-72
VUFO	2	177-195; 26-46; 119-123
	1	91-109
	3	8-25; 100-115
VAFJ	1	91-98; 78-85; 188-195; 59-66; 31-38
VEBT	1	9-16; 66-73; 89-96
	3	53-73
	4	1-21
VSPO	4	62-69; 113-120
	5	63-70; 131-134
	6	21-28; 196-198
	7	2-9
VBAW	1	1-260
	2	3-128
VCJH	1	1-228
VCQC	3	1-263
VSPO	4	1-184
VSPO	6	1-199
	7	1-177
	8	1-35
VAHH	1	1-189
	2	1-186
VCQC	2	1-207
VAKW	2	1-42

T-1700D-0

EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 5 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Mission	Roll	Frame
VAVW	1	185-194
	2	97-116; 61-70; 1-9
VCWK	1	59-64; 47-52; 26-32; 236-242; 225-231; 204-210 193-198; 172-178; 162-167
	2	56-62; 45-51; 3-9
VUFO	1	65-83
	3	77-95
	2	151-169; 124-142; 93-111
VCQC	2	70-96; 38-65; 3-30
	4	31-39; 15-24
VSPO	4	56-62; 120-126
	5	124-131; 27-34
	6	190-197
VAPF	1	1-17
VAVW	1	192-218
	2	114-139; 73-99; 38-62; 7-32
VAIC	1	190-202; 44-56; 98-102; 209-221; 122-130
	2	5-22; 57-73; 82-98; 130-152 214-230; 242-259; 174-177
	3	41-47; 17-23
CTOO	6	1-14
	13	70-102; 30-56
	5	112-147; 73-96; 4-23
	11	116-143
	15	87-100; 184-196
	1	122-146
	3	70-83; 141-149; 31-40
	2	41-48

T-1700E-0

EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 6 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Mission	Roll	Frame
VCQC	1	1-288
VEBT	3	1-8; 105-111
	4	45-51; 71-78; 83-89; 127-134 139-145; 183-190; 195-202 255-262
VDTC	1	99-124; 162-169; 186-219 244-264; 313-332; 371-502 518-569; 596-609
VEBT	1	1-10; 15-66; 72-78; 82-90 95-157; 162-198; 200-237
	2	3-28; 40-103
	3	1-25; 37-50; 61-67; 73-79; 111-134; 140-146
	4	9-16; 21-45; 53-72; 89-128; 145-184; 201-220; 225-236; 241-253; 261-280
VEBR	1	31-82; 87-111; 144-168; 174-197; 203-226; 230-254; 260-285
VDVA	1	4-45; 49-90; 97-138; 142-183
	2	4-45; 47-88
VAPF	2	1-285
	3	1-279
	4	1-278
	6	1-67
	5	1-255
VSPO	5	69-78; 118-131; 38-54; 2-27
	2	37-118; 141-144
	3	49-90; 122-150

T-1700F-0

EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 7 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Mission	Roll	Frame
A56037	10	1199-1232
	15	1536-1573
	4	393-433
VUF	1	81-91
	2	168-177
		141-147
		111-120
	3	68-73
	4	4-9

7. USGS Photomosaics

Scale 1:62,500, some are named while the rest only have alpha-numerical designations:

Mission	Mission	Mission
Grapeland	Diboll	VAPF00160150
Crockett N.E.	Trevat	VAPF00160163
Crockett	Wakefield	VAPF00160156
Berea	Apple Springs	VCWK00440243
Ratcliff	VAPF00160149	VAPF00160160
Kennard N.E.	VAPF00160154	VCWK00440232
Kennard	VAPF00160159	VAPF00160157
Centraila	VAPF00160151	VAHH00140057
Wells	VAPF00160148	VAHH00140056
Clawson	VAPF00160147	VAHH00140053
Wellson	VAVW00170993	VAHH00140052
Kelty	VAPF00160153	VAPF00160166

T-1700G-0

EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 8 of 9)

AERIAL PHOTOGRAPHS AND IMAGERY

PURCHASED IMAGERY (Continued)

Mission	Mission	Mission
VAPF00160161	VCQC00340279	VBAW00190526
VAHH00140058	VSP000380067	VBAW00190527
VCWK00440235	VAKW00150015	VBAW00190522
VCKW00440236	VUF00380475	VBAW00190523
VAHH00140054	VEBT00550357	VCJH00310374
VAHH00140055	VEBT00550356	VCJH00310375
VDTG00520307	VCQC00340289	VUF00380467
VDTG00520302	VCQC00340288	VSP000380070
VDTG00520303	VCQC00340293	VEBT00550348
VSP000380090	VCQC00340292	VCQC00340285
VSP000380091	VUF00380474	VCQC00340284
VSP000380078	VCQC00340290	VCQC00340281
VSP000380079	VCQC00340291	VCQC00340280
VSP000380082	VCQC00340294	VCQC00340277
VSP000380083	VCQC00340295	VCQC00340276
VSP000380080	VAVW00170986	VAFJ00130773
VSP000380081	VAPF00160144	VCQC00340286
VAKW00150011	VAPF00160143	VCQC00340287
VAKW00150008	VCQC00340297	VCQC00340282
VBIB00210893	VCQC00340296	VCQC00340283
VSP000380089	VAVW00170989	VCQC00340278
VSP000380088	VAPF00160145	
VSP000380071	VAPF00160146	
VSP000380067	VEBT00550375	
VSP000380066	VCQC00340298	
VSP000380065	VCQC00340299	
VSP000380064	VAVW00170990	
VAKW00150014	VAPF00160152	
VAKW00150009	VEBT00550340	
VAKW00150010	VBAW00190525	
VSP0038090	VBAW00190524	
VSP0038091	VBAW00190521	
VSP000380072	VBAW00190520	
VSP000380073	VCJH00310373	
VSP000380068	VCJH00310372	
VSP000380069	VUF00380466	
VSP000380066	VEBT00550343	

T-1700H-0

EAST TEXAS STUDY AREA

APPENDIX D-1

TABLE D-1.1 (Page 9 of 9)

IMAGERY FLOWN FOR THE AREA CHARACTERIZATION STUDY

1. Thermal

Black and white images on 5-inch* film format strips, scale 1:24,000 and

Color images on 70 MM film format strips, scale 1:48,000

Each strip covers an area approximately 2 miles** by 8 miles and

Each set of strips covers an area of approximately 64 mi^2*** centered over a dome.

OAKWOOD DOME VICINITY

6 strips	Q-Analog Black and white (Negative and print)
6 strips	Analog/Contour (Negative only)
6 strips	8-Level Color (Negative and print)

KEECHI AND PALESTINE DOMES VICINITY

6 strips	Q-Analog Black and white (Negative and print)
6 strips	Analog/Contour (Negative only)

2. Low Altitude

330 Color infrared positives each of 8 by 8 mile area centered around Grand Saline and Palestine Domes, scale 1:4000, flown in August, 1978.

330 Panchromatic negatives each of 8 by 8 mile area centered around Oakwood and Keechi Domes, scale 1:4000, flown in October, 1978.

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*To convert to millimeters, multiply by 25.4.
**To convert to kilometers, multiply by 1.609.
***To convert to square kilometers, multiply by 2.590.

T-1700I-0

EAST TEXAS STUDY AREA

APPENDIX D-2

TERRACE AND GEOLOGIC MAPPING DATA

The surface geologic data to be used for geologic characterization of the East Texas Study Area were provided by BEG. To meet the specific needs of this project, BEG reviewed, field-checked and updated existing geologic maps. The Study Area Geologic Map and Palestine Dome Area Geologic Map (Figures 6-7 and 7-26 in Volume IIB) were prepared by BEG. BEG also generated the Oakwood Dome Area Geologic Map (Figure 7-7 in Volume (IIB), which was published in the BEG Annual Report dated April, 1980. The Keechi Dome Area Geologic Map (Figure 7-17) was prepared by LETCo from data furnished by BEG and surface geological reconnaissance mapping. This map also appears in a topical report (LETCo, 1981a).

Terrace studies were also performed by BEG at different localities in the East Texas Study Area. Specific studies concerning the Trinity River terrace deposits are being undertaken by the BEG. Preliminary conclusions of their studies were transmitted to LETCo in the form of a copy of a BEG internal memo dated June 25, 1980.

EAST TEXAS STUDY AREA

APPENDIX D-2

REFERENCES

Law Engineering Testing Co., 1981, Surface geological reconnaissance of Keechi Dome, Anderson County, Texas: Law Engineering Testing Co., 7 p.

APPENDIX E

Geophysics

EAST TEXAS STUDY AREA

APPENDIX E-1

RESISTIVITY VERTICAL SOUNDINGS

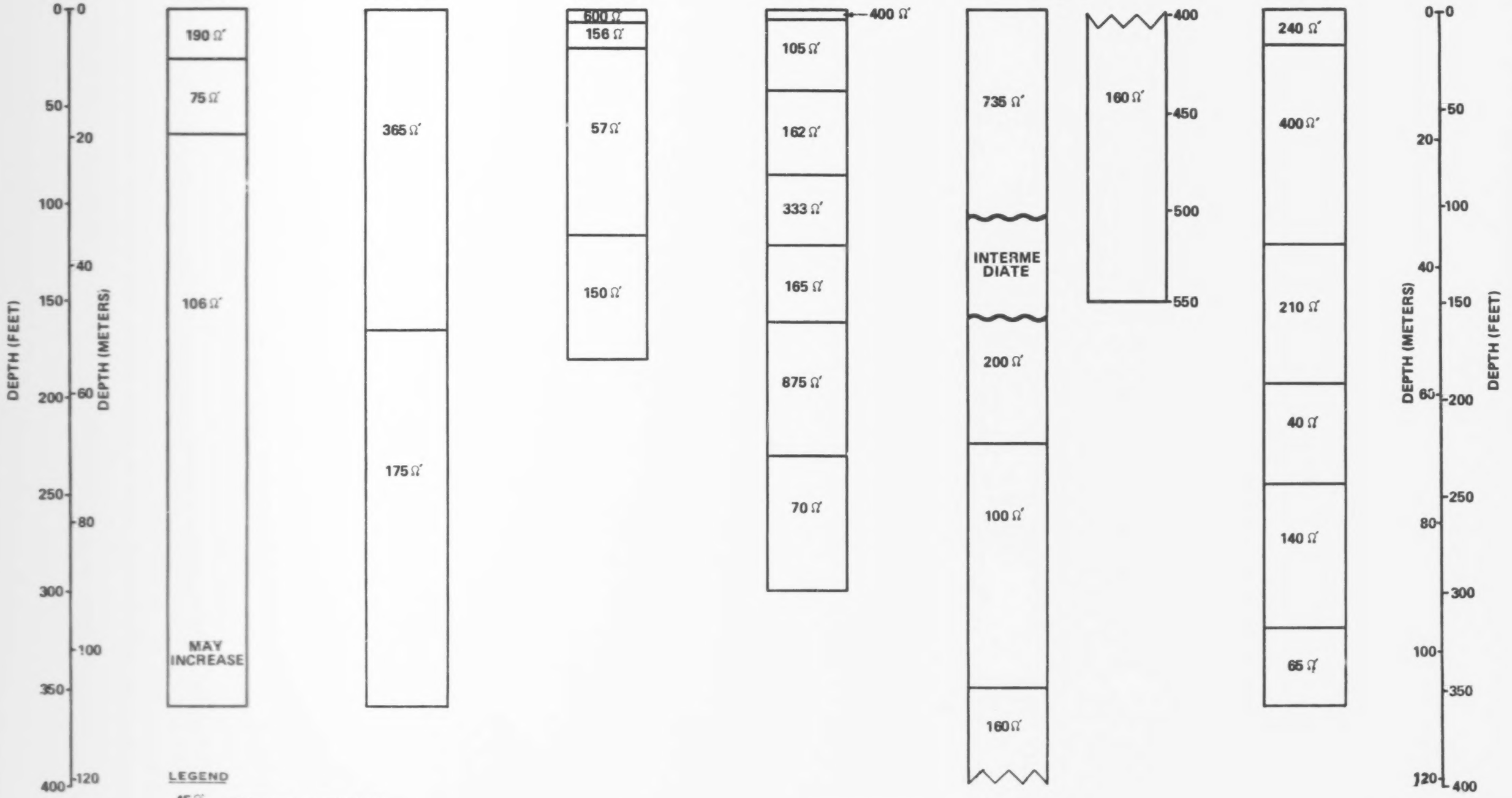
Twenty-four electrical resistivity vertical soundings were made at Oakwood Salt Dome by Law Engineering personnel during July and August, 1979. These soundings aided the interpretation of the near-surface geology of the area. The soundings were made concurrently with resistivity horizontal profiles (Appendix E-2).

All work was performed in accordance with LETCo Procedure No. 3.2, "Ground-Level Resistivity Surveys - Data Collection". The soundings were taken by means of an A.B.E.M. Terrameter 4-cycle direct-current resistivity meter, with the electrodes in a Wenner array. The spacing between electrodes, or "a" spacing, varied from 0.6 meters (2 ft) to a maximum of 137 meters (450 ft). The parameter measured in these surveys is electrical resistivity, the amount of resistance of a material to flow of electric current per unit cross-sectional area divided by unit length. The units of resistivity are in terms of electrical resistance multiplied by distance, typically ohm-feet (Ω').

The soundings, as interpreted by the inverse slope method, are presented in the form of pseudologs in Table E-1.1. The locations of the soundings are shown in Figure E-1.1. The interpretation of the pseudologs yields approximate depths to boundaries between geo-electric units. These boundaries generally correspond to changes in lithology within or bounding geologic units. The depths to the geo-electric changes are assumed to be

directly related to the "a" spacing. The interpretation of relatively thin geo-electric units may be caused by lateral variations in the resistivity of the surface material rather than by a change at depth.

The soundings were very useful in determining the depth to and dip of some geologic units in areas with little or no control from shallow borings. These interpretations were done by correlating the resistivity data with boring data and then using those correlations to recognize lithologic units away from the borings.



PREPARED	J.D.G	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

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NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX E-1
OAKWOOD DOME
PSEUDOLOGS OF ELECTRICAL RESISTIVITY VERTICAL SOUNDINGS
TABLE E-1.1
JOB NO. MV9700 PAGE 1 OF 3

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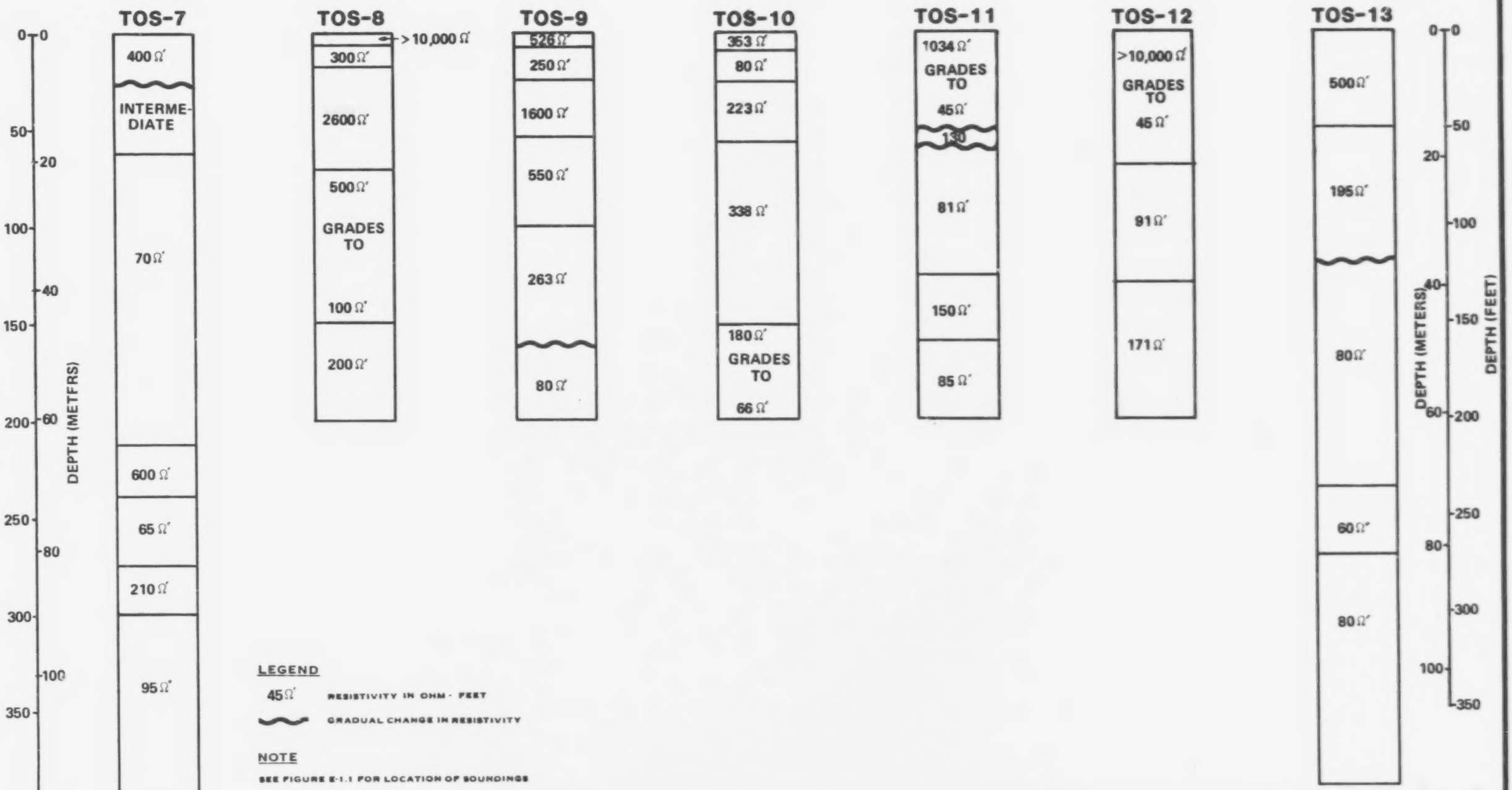

LEGEND

45 Ω′ RESISTIVITY IN OHM - FEET

GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED J.D.G.	DATE 12/23/80	NATIONAL WASTE TERMINAL STORAGE PROGRAM GEOLOGIC EVALUATION GULF COAST SALT DOMES AW ENGINEERING TESTING COMPANY MARIETTA GEORGIA
REVISED	DATE	
REVISED	DATE	
APPROVED GLF	DATE 12/22/80	

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EAST TEXAS STUDY AREA
APPENDIX E-1
OAKWOOD DOME
PSEUDOLOGS OF ELECTRICAL
RESISTIVITY VERTICAL SOUNDINGS

JOB NO. MV9700

TABLE E-1.1
PAGE 2 OF 3

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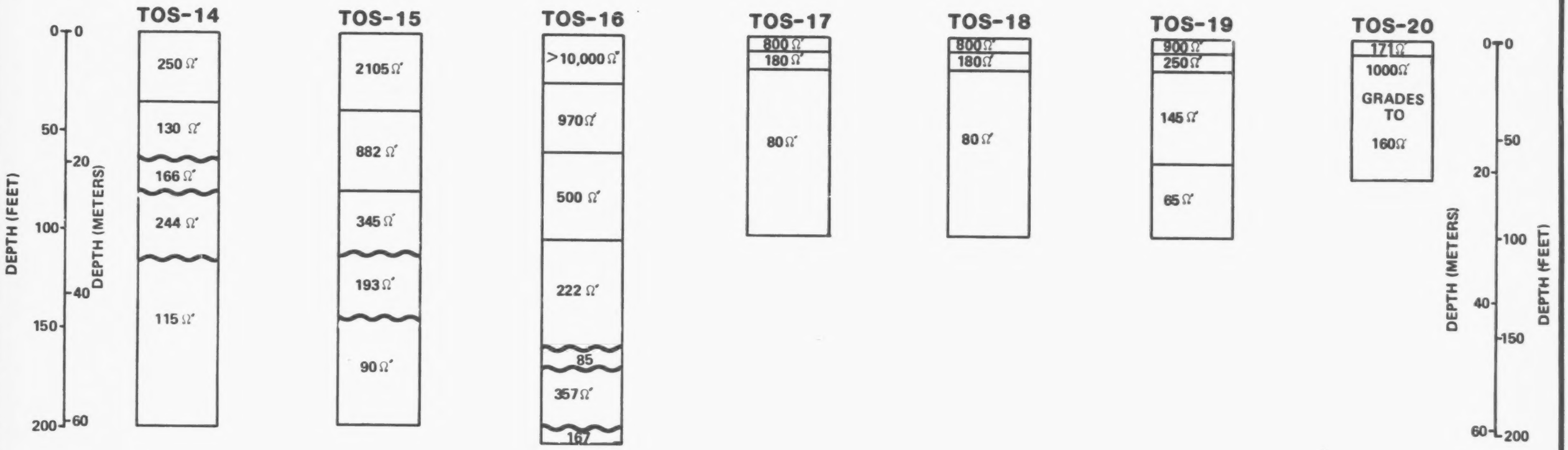

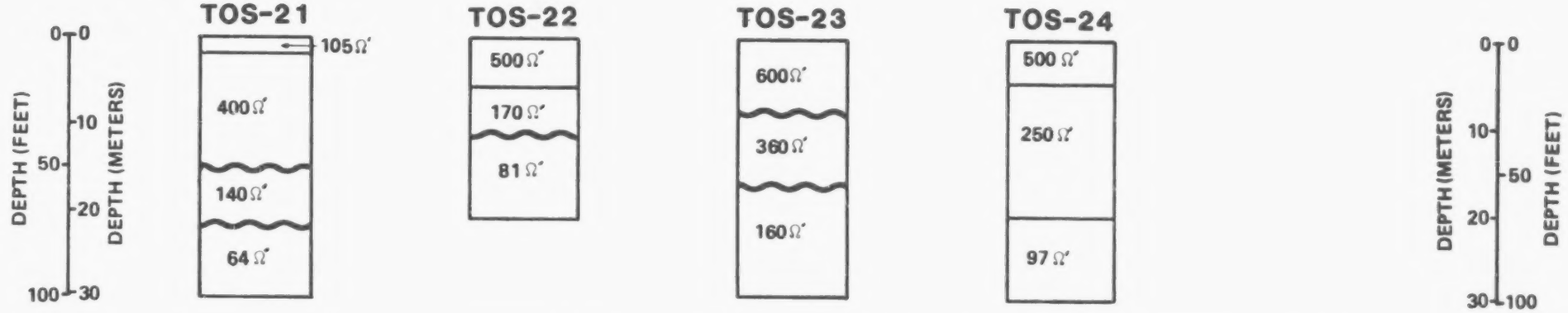

LEGEND

45Ω' RESISTIVITY IN OHM-FEET

GRADUAL CHANGE IN RESISTIVITY

NOTE

SEE FIGURE E-1.1 FOR LOCATION OF SOUNDINGS

PREPARED	J. D. G.	DATE	12/22/80
REVISED		DATE	
REVISED		DATE	
APPROVED	GHF	DATE	12/22/80

T-1590B-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM
GEOLOGIC EVALUATION GULF COAST SALT DOMES
LAW ENGINEERING TESTING COMPANY
MARIETTA GEORGIA

EAST TEXAS STUDY AREA
APPENDIX E-1
OAKWOOD DOME
PSEUDOLOGS OF ELECTRICAL RESISTIVITY VERTICAL SOUNDINGS
TABLE E-1.1
JOB NO. MV9700 PAGE 3 OF 3

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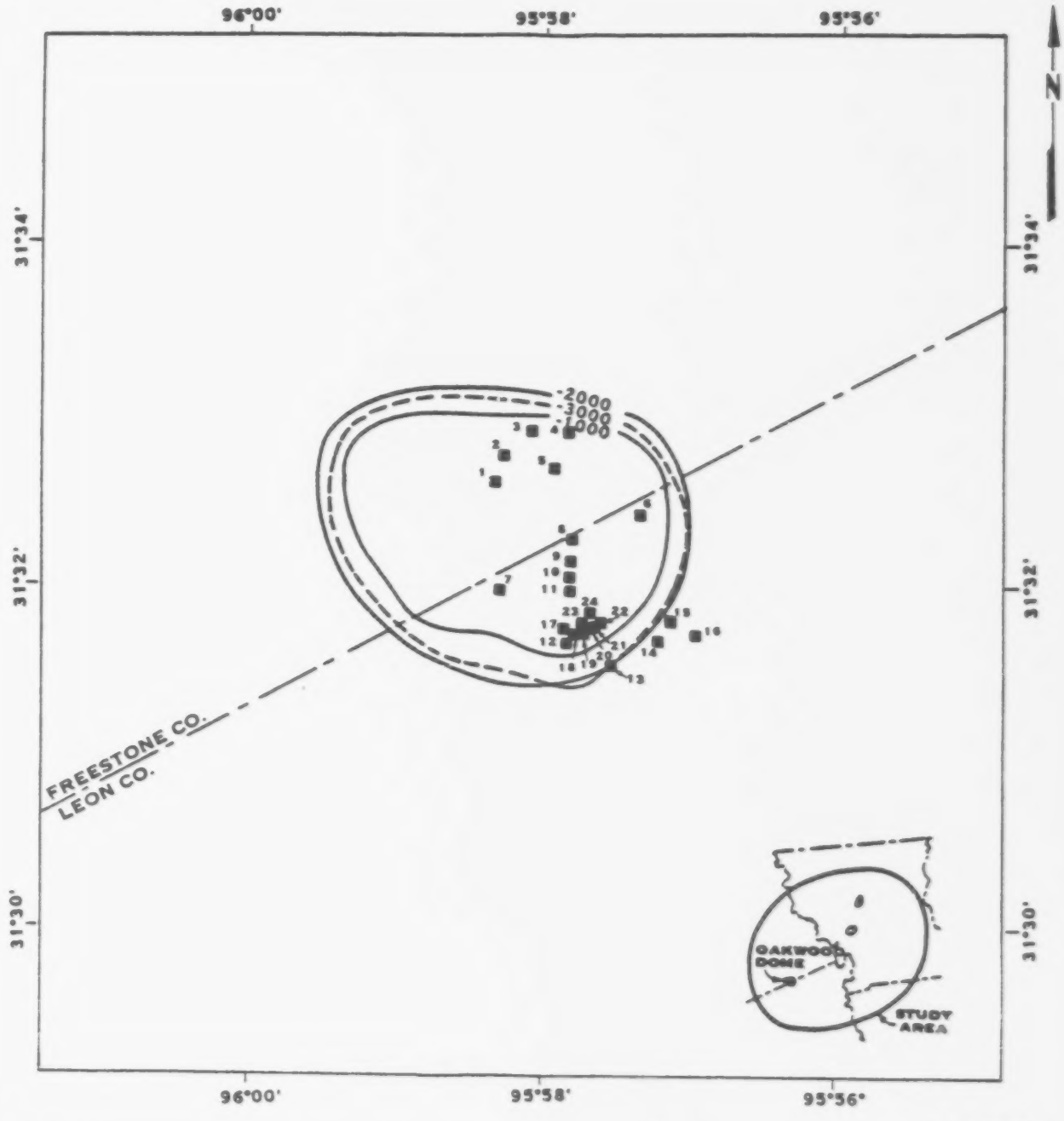

LEGEND

■⁹ GROUND LEVEL RESISTIVITY VERTICAL SOUNDING TOS-9

——-2000—— INTERPRETED SALT CONTOUR-ELEVATION FEET MSL (DASHED WHERE BENEATH OVERHANG)

NOTE

SEE TABLE E-1.1 FOR PSEUDOLOG REPRESENTATION OF VERTICAL SOUNDINGS

PREPARED LRG DATE 12/22/82	NATIONAL WASTE TERMINAL STORAGE PROGRAM	EAST TEXAS STUDY AREA
REVISED ____ DATE ____	GEOLOGIC EVALUATION GULF COAST SALT DOMES	APPENDIX E-1
REVISED ____ DATE ____	LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	OAKWOOD DOME LOCATION MAP OF VERTICAL RESISTIVITY SOUNDINGS
APPROVED GHF DATE 12/22/82		JOB NO. MV9700 FIGURE E-1.1
T-1555-1		

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EAST TEXAS STUDY AREA

APPENDIX E-2

RESISTIVITY HORIZONTAL PROFILES

Twenty-one kilometers (13 mi) of ground-level electrical resistivity horizontal profiling was performed by Law Engineering personnel during July and August, 1979. The profiling assisted in the interpretation of the near-surface geology in the vicinity of Oakwood Salt Dome. The profiles were performed concurrently with the resistivity vertical soundings (Appendix E-1).

An A.B.E.M. Terrameter 4-cycle direct-current resistivity meter was used with the electrodes in a Wenner array. All work was done in accordance with LETCo Procedure No. 3.2, "Ground-Level Resistivity Surveys-Data Collection". Most profiles were made with a 30-meter (100-ft) "a" spacing between electrodes. The locations of the profiles and the smoothed apparent resistivity values are shown in Figure E-2.1.

Because of the nature of the electrical resistivity survey technique the resistivity measured is an average resistivity of materials beneath the array. The measured value is called the apparent resistivity. If all the material were similar in electrical character, then the value measured would be the true resistivity. Clays exhibit low resistivity values, while sands and gravels have high resistivity values. The resistivity value of a material is dependent upon its porosity, degree of saturation, and type of pore fluid, as well as its lithology.

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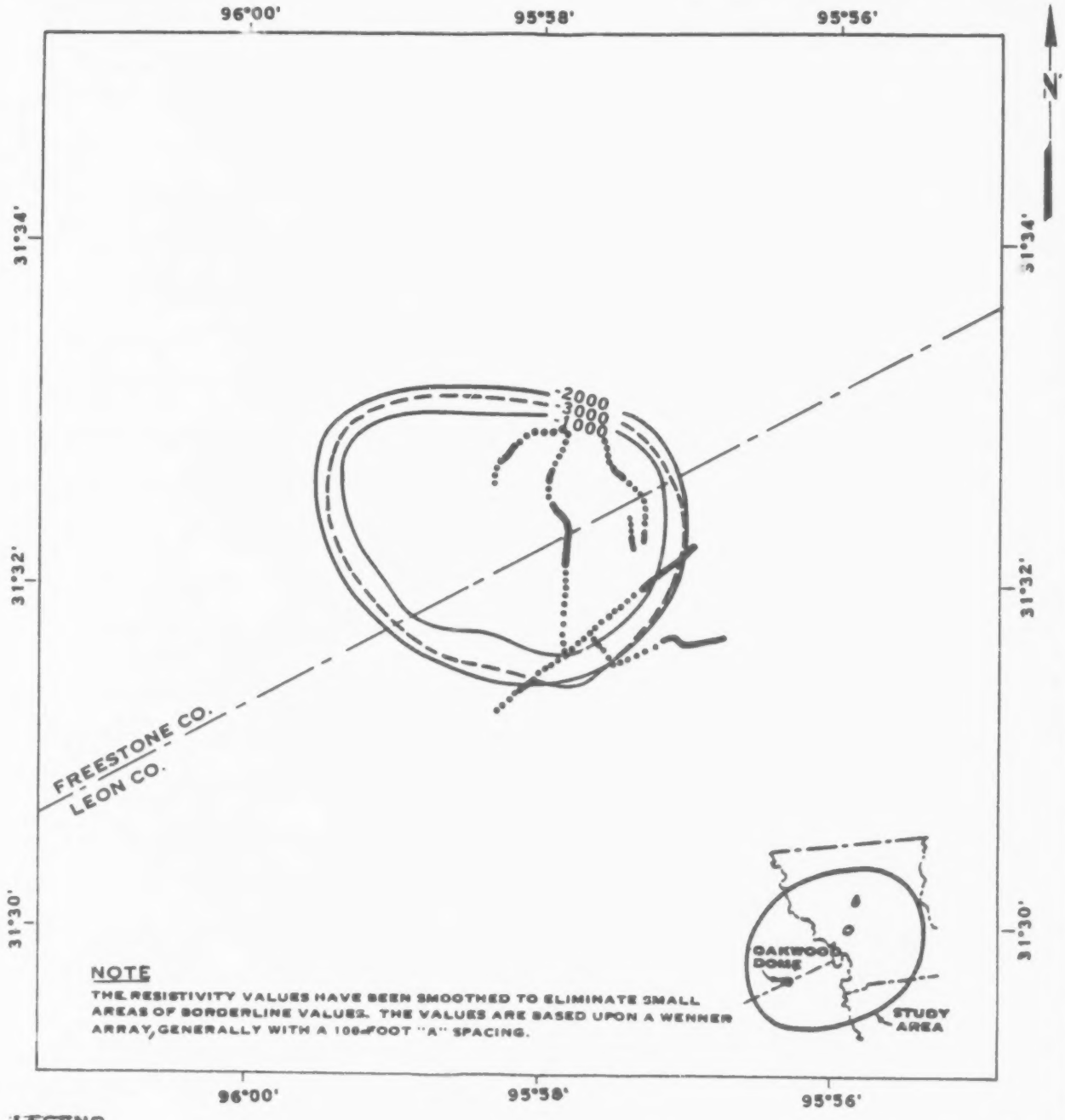

PREPARED J.D.G. DATE 12/22/80	NATIONAL WASTE TERMINAL STORAGE PROGRAM	EAST TEXAS STUDY AREA
REVISED ____ DATE ____	GEOLOGIC EVALUATION GULF COAST SALT DOMES	APPENDIX E-2
REVISED ____ DATE ____	LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	OAKWOOD DOME LOCATION AND APPARENT RESISTIVITY MAP OF HORIZONTAL PROFILES
APPROVED GHF DATE 12/22/80		JOB NO. MV9700 FIGURE E-2.1
T-1556-1		

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EAST TEXAS STUDY AREA

APPENDIX E-3

NEAR-DOME GRAVITY

Gravity data in the vicinity of Keechi and Oakwood Salt Domes in Texas were acquired for the purpose of modeling dome shapes. Existing data were purchased by LETCo for the Area Characterization study. A total of 1,406 gravity observations were obtained in the vicinity of Keechi Salt Dome, and 1,203 gravity observations near Oakwood Salt Dome. The data are considered proprietary by the vendor and therefore are not presented here.

The purchased data were compiled in the form of Bouguer gravity maps, which are contour maps of gravity units after elevation, latitude, and Bouguer corrections have been made to the observed gravity. These data were then submitted to a subcontractor to produce a residual map and to model the domes. To produce a residual map, the effects of deep-seated structural features were removed from the Bouguer values. The dome shapes were then modeled from the residual map and data from geophysical logs to fit the constraints of the known locations and depths to the domes from borehole data.

Additional data and discussion are contained in LETCo report entitled "Gravity Studies of Seven Interior Salt Domes, August, 1981".

EAST TEXAS STUDY AREA

APPENDIX E-4

HIGH-RESOLUTION SEISMIC SURVEYS

A high-resolution seismic reflection survey was performed at Keechi Salt Dome in order to help define the attitude of the sedimentary units near the dome, as well as to help define the sediment-salt stock contact and the shape of the dome. The survey recorded acoustic signals returning from reflecting strata at depths from about 244 to 1,067 meters (800 to 3,500 ft). The field work and data processing were performed by a subcontractor to LETCo. The processed time sections produced were interpreted by LETCo personnel and the results presented in the form of seismic sections correlated to the geologic units.

The nature of the raw field data, which was recorded on magnetic tape, makes it impractical to reproduce here. The scale of the processed data, presented in the form of time sections, is not conducive to legible, interpretable reproduction on a small scale and is therefore not included here. These data and interpretations are presented and discussed in the LETCo report "High-Resolution Seismic Surveys at Three Interior Salt Domes" (LETCo, 1981b).

EAST TEXAS STUDY AREA

APPENDIX E-4

REFERENCES

Law Engineering Testing Co., 1981, High resolution seismic surveys at three interior salt domes: Law Engineering Testing Co., 49 p.

APPENDIX F

Microseismicity

EAST TEXAS STUDY AREA

APPENDIX F-1

MICROSEISMIC DATA

For the purpose of detecting possible seismic activity on the Mount Enterprise Fault System, one high-gain, portable, micro-earthquake recorder (Sprengnether MEQ-800) has been in continuous field operation since February 3, 1980. The instrument is sited at approximately 31.9° N, 94.9° W, between Jacksonville and Rusk, Cherokee County, Texas (Figure F-1.1). The instrument was placed in operation by Law Engineering personnel in an area specified by BEG. The instrument is maintained by BEG personnel and the records are analyzed by LETCo personnel.

Seismograms recorded during the period February 3 through August 20, 1980 have been analyzed. During that time, approximately 3,700 hours of seismograph records had background noise low enough to detect low-amplitude seismic events with a high degree of confidence. The seismograms exhibit a strong diurnal character, with cultural noise usually restricted to the daylight hours. Local seismic signals noted during the February through August 20, 1980 period include:

(1) Local disturbances attributable to weather and human industry.

(2) Forty (40) small amplitude, impulsive signals recorded during the daylight hours of April 20 through April 23, 1980. Consistent signal character, amplitudes, and

origin times strongly suggest that these events are attributable to nearby blasting.

(3) Twenty-four (24) small-amplitude, impulsive signatures exhibiting certain characteristics of small, local blasts or microearthquakes.

It is probable that several of the 24 events mentioned above and listed in Table F-1.1 are not due to impulsive seismic sources (blasts or earthquakes). Instead, some may represent transient, nonseismic noise, such as sonic booms. Definitive determination of sources for the 24 events is not possible with the available data. Complete identification would require multistation recording and additional information concerning local industrial activities. The feasibility of a multistation network is being studied.

The distances of events from the recorder were estimated from P and S wave arrival time differences. Estimated source distances for all events lie between 6 and 69 km (4 and 43 mi). The recorded amplitudes of the event signatures are small and, in most instances, only slightly exceed the detection capability of the instrument. Local magnitudes for these events have been estimated and range from 1.8 on the Richter scale for events at smaller distances, to a maximum of roughly 2.8 for the more distant events.

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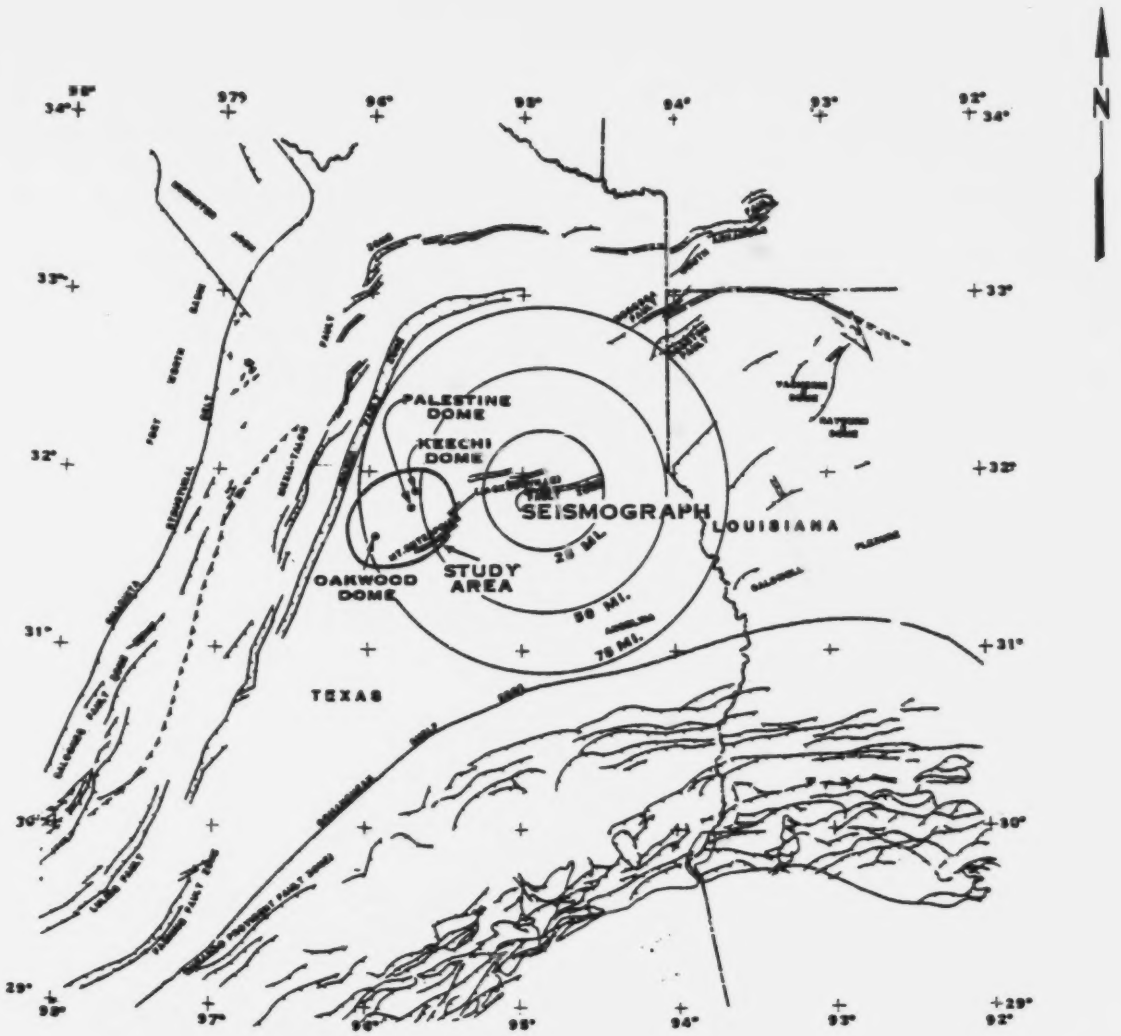

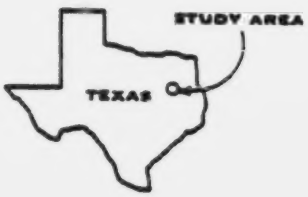

LEGEND

NORMAL FAULT, HACHURED ON DOWNTHROWN SIDE

REFERENCE

TECTONIC MAP OF GULF COAST REGION U.S.A., G.C.A.G.S., 1972

50 0 50 MILES
80 0 80 KILOMETERS

PREPARED J.D.G. DATE 12/22/80	NATIONAL WASTE TERMINAL STORAGE PROGRAM	EAST TEXAS STUDY AREA
REVISED ____ DATE ____	GEOLOGIC EVALUATION GULF COAST SALT DOMES	APPENDIX F-1
REVISED ____ DATE ____	LAW ENGINEERING TESTING COMPANY MARIETTA GEORGIA	LOCATION OF SEISMOGRAPH USED TO MONITOR MICROSEISMIC EVENTS
APPROVED GHF DATE 12/22/80		JOB NO. MV9700 FIGURE F-1.1
T-1557-1		

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EAST TEXAS STUDY AREA

APPENDIX F-1

TABLE F-1.1 (Page 1 of 2)

POTENTIAL SEISMIC EVENTS RECORDED
FEBRUARY 3 THROUGH AUGUST 20, 1980

DATE	ORIGIN TIME (LOCAL)	ESTIMATED DISTANCE (Miles)
04-23-80	12:31 AM	4
04-24-80	9:04 AM	11
05-02-80	6:43 AM	12
05-15-80	6:06 AM	9
05-24-80	4:29 PM	19
06-01-80	2:15 PM	38
06-06-80	1:00 AM	7
06-07-80	11:08 PM	19
06-07-80	12:34 AM	24
06-07-80	12:35 AM	43
06-15-80	6:21 AM	12
06-16-80	11:35 AM	12
06-18-80	2:09 PM	18
06-22-80	9:40 PM	30
06-22-80	9:41 PM	16
06-29-80	4:17 AM	27
06-29-80	8:30 AM	30
07-04-80	12:47 AM	18
07-12-80	12:17 PM	10

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EAST TEXAS STUDY AREA

APPENDIX F-1

TABLE F-1.1 (Page 2 of 2)

POTENTIAL SEISMIC EVENTS RECORDED
FEBRUARY 3 THROUGH AUGUST 20, 1980

DATE	ORIGIN TIME (LOCAL)	ESTIMATED DISTANCE (Miles)
07-13-80	1:44 PM	19
07-18-80	6:48 AM	25
07-20-80	9:17 PM	10
07-31-80	5:06 PM	21
08-02-80	8:32 AM	7

T-1684B-0

APPENDIX G

Seismicity

EAST TEXAS STUDY AREA

APPENDIX G-1

SEISMICITY

A search of the LETCo earthquake files was performed to produce a table of earthquakes with Modified Mercalli intensities (MMI) of IV-V or greater within the region between 86° to 100° W longitude and 29° to 38° N latitude (Table G-1.1). The location of the epicenters of these events are shown on Figure G-1.1.

The LETCo earthquake file is a compilation of earthquakes from the following sources:

(1) Department of Commerce, 1973, Earthquake History of the United States (Rev. through 1970), Washington, D.C.: Department of Commerce. 5 volumes.

(2) Moneymaker, Berlen C., 1954-1958, Earthquakes in Tennessee and Nearby Sections of Neighboring States. Journal of the Tennessee Academy of Science, v. 29-33 (exclusive).

(3) Coast and Geodetic Survey, 1928- , United States Earthquakes. Washington, D. C.: Government Printing Office. (Annual Publication).

(4) Magnetic Tape Chronological Sort 1900-1973, Earthquake Data File, National Geophysical and Solar-Terrestrial Data Center, Boulder, Colorado, Environmental Data and Information Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

(5) U.S. Geological Survey, Preliminary Determination of Epicenters. (Monthly)

(6) Law Engineering Testing Company, Internal Reports, Marietta,Ga.

(7) Heigold, P. C., 1972, Notes on the Earthquake of September 15, 1972 in Northern Illinois. Urbana, IL: Illinois Geological Survey, Environmental Geology Notes 59.

(8) U.S. Geological Survey, Earthquakes of the United States. (Quarterly)

(9) Nuttli, Otto, 1974, Magnitude-Recurrence Relation for Central Mississippi Valley Earthquakes. Bulletin of the Seismological Society of America, v. 64, no. 4, p. 1189-1207.

(10) Bradley, E. A., and Bennett, T. J., 1965, Earthquake History of Ohio, BSSA, Vol. 55, No. 4, pp. 745-752

(11) Bollinger, Gilbert A., 1975, A Catalog of Southeastern United States Earthquakes, 1754-1974. Blacksburg, VA: Virginia Polytechnic Institute.

(12) McClain, William C. and Myers, O. H., 1970, Seismic History and Seismicity of the Southeastern Region of the United States. Oak Ridge, TN: Oak Ridge National Laboratory.

(13) U.S. Geological Survey, Earthquake Information Bulletin. (Bi-monthly)

(14) Docekal, Jerry, 1970, Earthquakes of the Stable Interior with Emphasis on the Midcontinent. Lincoln, NE: University of Nebraska, Dissertation, 2 volumes.

APPENDIX G-1

TABLE G-1.1 (PAGE 1 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1811	DEC. 16	02:00	XII	NEW MADRID, MO.	36.6	89.6	2000000	1	FELT TO THE EAST
1812	JAN. 23	09:00	XII	NEW MADRID, MO.	36.6	89.6		1	
1812	FEB. 7	03:45	XII	NEW MADRID, MO.	36.6	89.6		1	
1818	MARCH 1	00:00	IV-V	MISSISSIPPI VALLEY	35.0	90.0		2	*COORDS, DATE, TIME
1820	NOV. 9	16:00	IV-V	CAPE GIRARDEAU, MO.	37.3	89.5		1	
1834	NOV. 20	13:40	V	NORTHERN KENTUCKY	37.0	86.0		1	*COORDS
1841	DEC. 27	23:50	V	NEAR HICKMAN, KY.	36.4	89.2		1	*COORDS
1843	JAN. 4	20:45	VIII	EASTERN ARKANSAS	35.5	90.5	400000	9	INT. IX-X - REF.2
1855	MAY 2	21:33	IV-V	CAIRO, IL.	37.0	89.2		2	*COORDS
1856	NOV. 9	00:00	IV-V	IL., KY., TN.	37.0	89.0		2	*COORDS, TIME
1865	AUG. 17	09:00	VII	DYERSBURG, TN.	36.0	89.5	24000	9	
1878	MARCH 12	04:00	V	COLUMBUS, KY.	36.8	89.2		1	FELT LOCALLY
1878	NOV. 18	23:52	VI	SOUTHEASTERN MISSOURI	36.7	90.4	150000	1	INT. VI-VIII, REF. 2
1882	JULY 20	04:00	V	SOUTHERN ILLINOIS	38.0	90.0	3000	1	
1882	OCT. 22	16:15	VI-VII	ARKANSAS	35.0	94.0	135000	1	
1883	JAN. 11	01:12	VI	CAIRO, IL.	37.0	89.2	80000	1	
1883	APRIL 12	02:30	VI-VII	CAIRO, IL.	37.0	89.2		1	FELT LOCALLY
1883	JULY 14	01:30	IV-V	CAIRO, IL.	37.0	89.2		2	
1883	DEC. 5	09:20	V	IZARD CO., AR.	36.3	91.8		1	FELT LOCALLY
1886	FEB. 4	20:00	V	ALABAMA	32.8	88.0	1600	1	
1886	FEB. 13	00:00		ALABAMA	32.8	88.0		1	*TIME, INT.
1887	AUG. 2	12:36	V	CAIRO, IL.	37.0	89.2		1	WIDESPREAD EFFECTS
1889	JULY 19	19:32	VI	MEMPHIS, TN.	35.2	90.0		1	INT. V-VII, REF. 2
1891	JAN. 8	00:00	VII	ROSK, TX.	31.7	95.7		1	

*ESTIMATE

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APPENDIX G-1

TABLE G-1.1 (PAGE 2 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1891	JULY 26	20:28	VI	EVANSVILLE, IN.	37.9	87.5		1	
1891	SEPT. 26	22:55	V	CAIRO, IL.	37.0	89.2		2	*COORDS
1895	OCT. 31	05:08	IX	MISSOURI	37.0	89.4	1000000	9	INT. VIII, REF. 1
1895	OCT. 31	05:08	IX	MISSOURI	37.0	89.4	1000000	9	INT. VIII, REF. 1
1897	APRIL 30	22:00	IV-V	TENNESSEE AND ILLINOIS	36.0	89.0		1	*COORDS
1903	NOV. 27	03:20	V	NEW MADRID, MO.	36.5	89.5	70000	1	
1904	OCT. 27	00:00	V	KANSAS	37.7	100.0	2700	1	*TIME
1905	AUG. 21	23:08	VI	MISSISSIPPI VALLEY	36.0	90.0	40000	1	*COORDS
1907	JULY 4	03:00	IV-V	FARMINGTON, MO.	37.7	90.4	400	1	
1908	SEPT. 28	13:34	IV-V	NEW MADRID, MO.	36.5	89.5	5000	1	
1908	OCT. 27	18:27	V	CAIRO, IL.	37.0	89.2	5000	1	
1909	OCT. 23	01:10	V	SOUTHEASTERN MISSOURI	37.0	89.5	40000	1	INT. V-VI, REF. 2
1911	MARCH 31	10:57	V	RISON, AR.	33.8	92.2	18000	1	2 SHOCKS, 73 MIN. APART
1914	DEC. 29	19:00	IV-V	ANDERSON, TX.	30.5	95.9	70	3	
1915	APRIL 28	17:40	IV-V	NEW MADRID, MO.	36.4	89.5	200	1	
1915	OCT. 26	01:40	V	MAYFIELD, KY.	36.7	88.6		1	FELT LOCALLY
1915	DEC. 7	12:40	V-VI	NEAR MOUTH OF OHIO RIVER	36.7	89.1	60000	1	
1916	OCT. 18	16:04	VII	IRONDALE, AL.	33.5	86.2	100000	1	
1916	DEC. 18	23:42	I-VII	HICKMAN, KY.	36.6	89.3		1	FELT LOCALLY
1917	JUNE 29	20:23	V	ALABAMA	32.7	87.5		1	FELT LOCALLY
1918	SEPT. 19	10:30	V	EL RENO, OK.	35.5	98.0		1	FELT LOCALLY, AFTERSHOCKS
1918	OCT. 15	21:30	V	WESTERN TENNESSEE	35.2	89.2	20000	1	
1919	NOV. 3	14:40	IV-V	ARKANSAS	36.2	90.9		1	FELT LOCALLY
1922	MARCH 22	16:30	V	SOUTHERN ILLINOIS	37.3	88.6	25000	1	*COORDS, 2 SHOCKS

*ESTIMATE

T-1398D-0

APPENDIX G-1

TABLE G-1.1 (PAGE 3 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1922	MARCH 23	15:45	V	WESTERN KENTUCKY	37.0	88.0		1	*COORDS
1922	MARCH 29	20:20	V	CENTRAL TENNESSEE	35.0	86.0		2	*COORDS
1922	MARCH 30	10:53	V	MISSISSIPPI VALLEY	35.2	90.6		2	
1922	NOV. 26	21:31	V	MISSISSIPPI VALLEY	37.0	90.5		2	*COORDS
1923	OCT. 28	11:10	VII	MARKED TREE, AR.	35.5	90.3	40000	1	
1923	NOV. 26	17:25	VI	MISSISSIPPI VALLEY	35.4	90.4		9	*COORDS
1923	DEC. 31	21:05	V	ARKANSAS	35.4	90.3	30000	1	
1924	MARCH 2	05:18	V	KENTUCKY	36.9	89.1	15000	1	
1925	APRIL 26	22:05	V	INDIANA	38.0	87.5	100000	1	
1925	MAY 13	06:00	V	KENTUCKY	36.7	88.6	3000	1	
1925	SEPT. 2	05:55	V-VI	HENDERSON, KY.	37.8	87.6	75000	1	
1926	JUNE 20	08:20	V	OK.-AK. BORDER	35.5	94.9	18000	14	
1927	MAY 7	02:28	VII	MISSISSIPPI VALLEY	36.5	89.0	130000	1	
1927	JUNE 16	07:00	V	SCOTTSBORO, AL.	34.7	86.0	2500	1	
1927	AUG. 13	10:00	V	MISSISSIPPI VALLEY	36.4	89.5		2	*COORDS
1929	NOV. 27		V	SOUTHERN KANSAS	37.2	99.7		4	
1929	DEC. 27	18:30	VI	EL RENO, OK.	35.5	98.0	8000	1	
1930	AUG. 29	00:27	V	KY., TN., IL., MO.	37.0	89.0		2	*COORDS
1930	OCT. 19	06:17	V-VI	DONALDSONVILLE, LA.	30.0	91.0	18000	6	
1931	MAY 5	07:18	V	CULLMAN, AL.	33.7	86.6	6500	3	INT. V-VI, REF. 1
1931	DEC. 16	21:36	VI	BATESVILLE, MS.	34.1	89.8	65000	3	INT. VI-VII, REF. 1
1932	APRIL 9	04:15	V	MEXIA, TX.	31.7	96.4	1000	3	
1933	AUG. 19	13:30	V	EL RENO, OK.	35.5	98.0	200	3	INT. VI, REF. 1
1933	DEC. 9	02:40	V	MANILA, AR.	35.8	90.2	100	3	INT. VI, REF. 1
1934	APRIL 11	11:40	V	TX.-OK. BORDER	33.9	95.5	3000	3	
1934	AUG. 19	18:47	VI	RODNEY, MO.	37.0	89.2	28000	3	INT. VII, REF. 1

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APPENDIX G-1

TABLE G-1.1 (PAGE 4 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1936	MARCH 14	11:20	V	SOUTHEASTERN OKLAHOMA	34.0	95.2	900	3	
1937	MAY 16	18:50	IV-V	NORTHEASTERN ARKANSAS	36.1	90.6	25000	1	INT. III, REF. 3
1938	SEPT. 17	21:34	IV-V	NORTHEASTERN ARKANSAS	35.5	90.3	90000	1	INT. IV, REF. 3
1939	JUNE 19	15:43	V	ARKADELPHIA, AR.	34.1	93.1		3	FELT LOCALLY
1940	MAY 31	13:02	IV-V	OHIO RIVER	37.0	88.0	1000	2	*COORDS
1941	OCT. 18	01:48	V	BESSIE, OK.	35.4	99.0	100	12	
1941	NOV. 16	21:09	V-VI	COVINGTON, TN.	35.5	89.7		3	FELT LOCALLY, INT. V, REF.2
1947	SEPT. 20	15:30	IV-V	WINNFIELD, LA.	31.9	92.7		12	
1947	DEC. 15	21:27	V	NEAR OSCEOLA, AR.	35.5	90.0	10000	2	*COORDS
1949	JAN. 13	21:45	V	MISSISSIPPI VALLEY	36.4	89.5	7000	2	*COORDS
1950	FEB. 8	04:37	V	LEBANON, MO.	37.4	92.4		3	
1952	FEB. 20	16:35	V	TN.-MO. BORDER	36.4	89.5		3	
1952	APRIL 9	10:29	VII	EL RENO, OK.	35.4	97.8	140000	3	
1952	APRIL 16	00:05	V	EL RENO, OK.	35.4	97.8		3	
1952	JULY 16	17:48	VI	DYERSBURG, TN.	36.2	89.6		3	
1953	MARCH 17	07:12	VI	CONCHO, OK.	35.6	97.8		3	2 SHOCKS
1954	FEB. 2	10:53	VI	POPLAR BLUFF, MO.	36.7	90.3		3	
1954	APRIL 26	20:09	V	MEMPHIS, TN.	35.2	90.0		3	
1955	JAN. 25	01:24	VI	TN., AR., MO.	35.6	90.3	30000	3	
1955	FEB. 1	08:45	V	GULFPORT, MS.	30.4	89.1		3	
1955	MARCH 29	03:03	VI	FINLEY, TN.	36.0	89.5		3	
1955	SEPT. 5	19:45	V	FINLEY, TN.	36.0	89.5		3	
1955	DEC. 13	01:43	V	DYER CO., TN.	36.0	89.5		3	*TIME
1956	JAN. 6	05:58	VI	SOUTHERN KANSAS	37.3	98.5	16000	1	

*ESTIMATE

APPENDIX C-1

TABLE C-1.1 (PAGE 5 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1956	JAN. 28	22:14	VI	TN.-AR. BORDER	35.6	89.6	11500	3	
1956	FEB. 16	17:30	VI	EDMOND, OK.	35.4	97.3		3	
1956	APRIL 2	10:03	V	SOUTHEASTERN OKLAHOMA	34.2	95.4		3	
1956	OCT. 29	03:24	V	CARUTHERSVILLE, MO.	36.1	89.4		3	
1956	OCT. 30	04:36	VII	NORTHEASTERN OKLAHOMA	36.2	95.0	3700	3	
1956	NOV. 25	22:13	VI	WAYNE CO., MO.	37.1	90.6	21300	3	
1957	MARCH 19	10:38	V	NORTHEASTERN TEXAS	32.0	95.0	10100	3	*COORDS, 4 SHOCKS
1957	MARCH 26	02:27	V	PADUCAH, KY.	37.0	88.4		3	FELT LOCALLY
1957	APRIL 23	04:24	VI	BIRMINGHAM, AL.	34.5	86.8	11500	3	
1958	JAN. 26	10:56	V	MEMPHIS, TN.	35.2	90.0		3	FELT LOCALLY
1958	JAN. 27	23:57	V	IL.-KY.-MO. BORDER	37.0	89.0	300	3	
1958	APRIL 8	16:26	V	OBION CO., TN.	36.2	89.1	400	3	
1958	APRIL 26	01:30	V	LAKE CO., TN.	36.3	89.5		3	
1958	NOV. 19	12:15	V	BATON ROUGE, LA.	30.3	91.1		3	FELT LOCALLY
1959	FEB. 13	02:37	V	BOGOTA, TN.	36.2	89.5	170	3	
1959	JUNE 15	06:45	V	SEMINOLE CO., OK.	35.0	97.0		3	*COORDS
1959	JUNE 17	04:27	VI	SOUTHWESTERN OKLAHOMA	34.5	98.5	12000	3	
1959	AUG. 12	11:06	VI	AL.-TN. BORDER	35.0	87.0	2800	3	
1959	DEC. 21	10:25	V	FINLEY, TN.	36.0	89.5	400	3	
1960	JAN. 28	15:38	V	DYER CO., TN.	36.0	89.5		3	FELT LOCALLY
1960	APRIL 21	04:45	V	LAKE CO., TN.	36.3	89.5		3	FELT LOCALLY
1961	JAN. 10	19:40	V	SOUTHEASTERN OKLAHOMA	35.0	95.0		3	*COORDS
1961	APRIL 27	01:30	V	SOUTHEASTERN OKLAHOMA	35.0	95.0		3	*COORDS, TIME
1962	FEB. 2	00:44	VI	NEW MADRID, MO.	36.5	89.6	15000	3	

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APPENDIX C-1

TABLE C-1.1 (PAGE 6 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1962	JUNE 26	19:29	V	SOUTHERN ILLINOIS	37.7	88.5		3	
1962	JULY 23	00:05	VI	SOUTHERN MISSOURI	36.1	89.8		3	
1963	MARCH 3	11:30	VI	SOUTHEASTERN MISSOURI	36.7	90.1	100000	3	
1963	JULY 8	17:52	V	SOUTHEASTERN MISSOURI	37.0	90.5		4	*INT.
1963	AUG. 2	18:38	V	IL.-KY. BORDER	37.0	88.8		3	
1964	JAN. 16	23:10	VI	SOUTHEASTERN MISSOURI	36.8	89.5		4	*INT.
1964	APRIL 23	19:21	V	WESTERN LOUISIANA	31.5	93.8		3	
1964	APRIL 24	01:34	V	WESTERN LOUISIANA	31.6	93.8		3	
1964	APRIL 27	18:31	V	WESTERN LOUISIANA	31.5	93.8		3	
1964	APRIL 28	15:19	V	WESTERN LOUISIANA	31.7	93.6		3	
1964	MAY 23	05:26	V	SOUTHEASTERN MISSOURI	36.5	90.0		4	*INT.
1964	MAY 23	09:01	VI	SOUTHEASTERN MISSOURI	36.5	89.9		4	*INT.
1964	AUG. 16	05:36	V	HEMPHILL, TX.	31.4	93.8		3	
1965	FEB. 10	21:40	VI	SOUTHEASTERN MISSOURI	36.4	89.7		4	*INT.
1965	AUG. 13	23:46	VI	SOUTHWESTERN ILLINOIS	36.3	89.5		3	*INT.
1965	AUG. 14	07:14	VII	SOUTHWESTERN ILLINOIS	37.1	89.2		3	
1965	AUG. 15	00:07	V	SOUTHWESTERN ILLINOIS	37.4	89.5		3	2 SHOCKS
1965	OCT. 20	20:05	VI	EASTERN MISSOURI	37.8	91.0	160000	3	
1965	NOV. 4	01:44	V	SOUTHEASTERN MISSOURI	37.1	91.0		4	*INT.
1965	DEC. 19	16:19	VII	NORTHEASTERN ARKANSAS	35.9	89.9		4	*INT.
1966	FEB. 13	17:20	V	SOUTHEASTERN MISSOURI	37.1	91.0		4	*INT.
1966	FEB. 26	02:10	V	SOUTHEASTERN MISSOURI	37.2	91.0		4	*INT.
1967	JUNE 4	10:14	VI	GREENVILLE, MS.	33.6	90.9	25000	3	
1967	JUNE 29	07:57	V	GREENVILLE, MS.	33.6	90.9		3	

*ESTIMATE

APPENDIX G-1

TABLE G-1.1 (PAGE 7 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1967	JULY 21	03:15	VI	SOUTHEASTERN MISSOURI	37.5	90.4		3	
1968	FEB. 9	19:15	V	SOUTHEASTERN MISSOURI	36.5	89.9		3	*INT.
1968	OCT. 14	08:43	VI	DURANT, OK.	34.0	96.8		3	
1968	NOV. 9	11:02	VII	SOUTHERN ILLINOIS	38.0	88.5	580000	3	
1969	JAN. 1	17:16	VI	CENTRAL ARKANSAS	34.8	92.6	23000	3	
1969	MAY 2	05:33	V	EASTERN OKLAHOMA	35.2	96.3	13000	3	
1970	MARCH 26	21:44	V	SOUTHEASTERN MISSOURI	36.5	89.7		3	*INT.
1970	NOV. 16	20:14	VI	ARKANSAS	35.9	89.9	78000	3	
1971	MARCH 14	11:28	V	CARROLLTON, AL.	33.1	87.9		3	*INT.
1971	OCT. 1	12:50	V	NORTHEASTERN ARKANSAS	35.8	90.4	55000	3	
1972	JAN. 31	23:42	V	NORTHEASTERN ARKANSAS	36.4	90.8		3	
1972	MARCH 29	14:39	V	NEW MADRID, MO.	36.2	89.6	65800	3	
1973	JAN. 7	16:56	V	KENTUCKY	37.4	87.3		3	*INT.
1973	JAN. 8	03:12	V	MISSISSIPPI	33.8	90.6		5	*INT.
1973	JAN. 12	05:57	V	EASTERN MISSOURI	37.9	90.5		5	*INT.
1973	MAY 25	08:40	V	MISSISSIPPI	33.8	90.6		3	*INT.
1973	DEC. 20	04:45	V	NEW MADRID, MO.	36.2	89.6		5	*INT.
1974	JAN. 7	19:13	V	NEW MADRID, MO.	36.2	89.4		5	*INT.
1974	FEB. 15	16:36	V	ARKANSAS	34.1	93.1		5	SEVERAL WEAKER SHOCKS
1974	FEB. 24	01:54	V	ARKANSAS	35.8	90.4		5	*INT.
1974	MARCH 4	08:24	V	ARKANSAS	35.7	90.4		5	*INT.
1974	MARCH 9	22:34	IV-V	NEW MADRID, MO.	36.2	89.5		5	*INT.
1974	MARCH 12	06:30	V	TENNESSEE	35.7	89.8		5	*INT.
1974	MAY 13	00:52	VI	NEW MADRID, MO.	36.7	89.4	800	8	

*ESTIMATE

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APPENDIX C-1

TABLE C-1.1 (PAGE 8 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1974	AUG. 11	08:30	V	FREMONT, MO.	36.9	91.2		5	
1974	DEC. 10	00:02	V	SOUTHWESTERN ALABAMA	31.3	87.5		8	
1974	DEC. 12	23:06	V	NORTHEASTERN ARKANSAS	34.7	91.9		8	
1975	FEB. 13	13:44	V	NEW MADRID, MO.	36.5	89.6		3	
1975	JUNE 13	16:40	VI	NEW MADRID, MO.	36.5	89.7		5	
1975	JUNE 24	05:12	IV-V	ALABAMA	33.7	87.8		3	
1975	JULY 6	02:48	IV-V	NEW MADRID, MO.	36.2	89.5		5	*INT.
1975	AUG. 20	03:14	IV-V	NEW MADRID, MO.	36.6	89.8		5	*INT.
1975	AUG. 24	18:44	IV-V	EASTERN MISSOURI	37.2	90.9		5	*INT.
1975	AUG. 24	21:01	IV-V	EASTERN MISSOURI	37.2	90.9		5	*INT.
1975	AUG. 25	01:11	V	NEW MADRID, MO.	36.1	89.8		5	*INT.
1975	AUG. 28	22:23	VI	NORTHERN ALABAMA	33.8	86.6	10000	3	
1975	OCT. 11	21:58	V	OKLAHOMA	34.8	97.4		5	*INT.
1975	NOV. 29	08:30	VI	FOSTER, OK.	34.5	97.4		3	
1975	DEC. 2	21:01	VI	NEW MADRID, MO.	36.5	89.6		3	
1976	MARCH 24	18:41	VI	ARKANSAS	35.6	90.5		3	
1976	APRIL 15	01:04	V	KENTUCKY	37.4	87.3		5	
1976	MAY 22	01:41	V	NEW MADRID, MO.	36.0	89.8		3	
1976	SEPT. 25	08:07	V	ARKANSAS	35.6	90.4		1	
1976	OCT. 22	18:41	V	MISSISSIPPI	32.2	88.7		5	*INT.
1976	DEC. 13	02:36	V	EASTERN MISSOURI	37.8	90.2		3	
1977	JAN. 1	16:57	VI	CAPE GIRARDEAU, MO.	37.6	89.8		8	
1977	MAY 1	20:00	V	MISSISSIPPI	32.0	88.4		8	
1977	JUNE 2	17:29	VI	ARKANSAS	34.6	94.2		8	*INT.

*ESTIMATE

APPENDIX C-1

TABLE C-1.1 (PAGE 9 OF 9)

REGIONAL HISTORIC SEISMICITY
(Lat. 29°-38°N, Long. 86°-100°W)

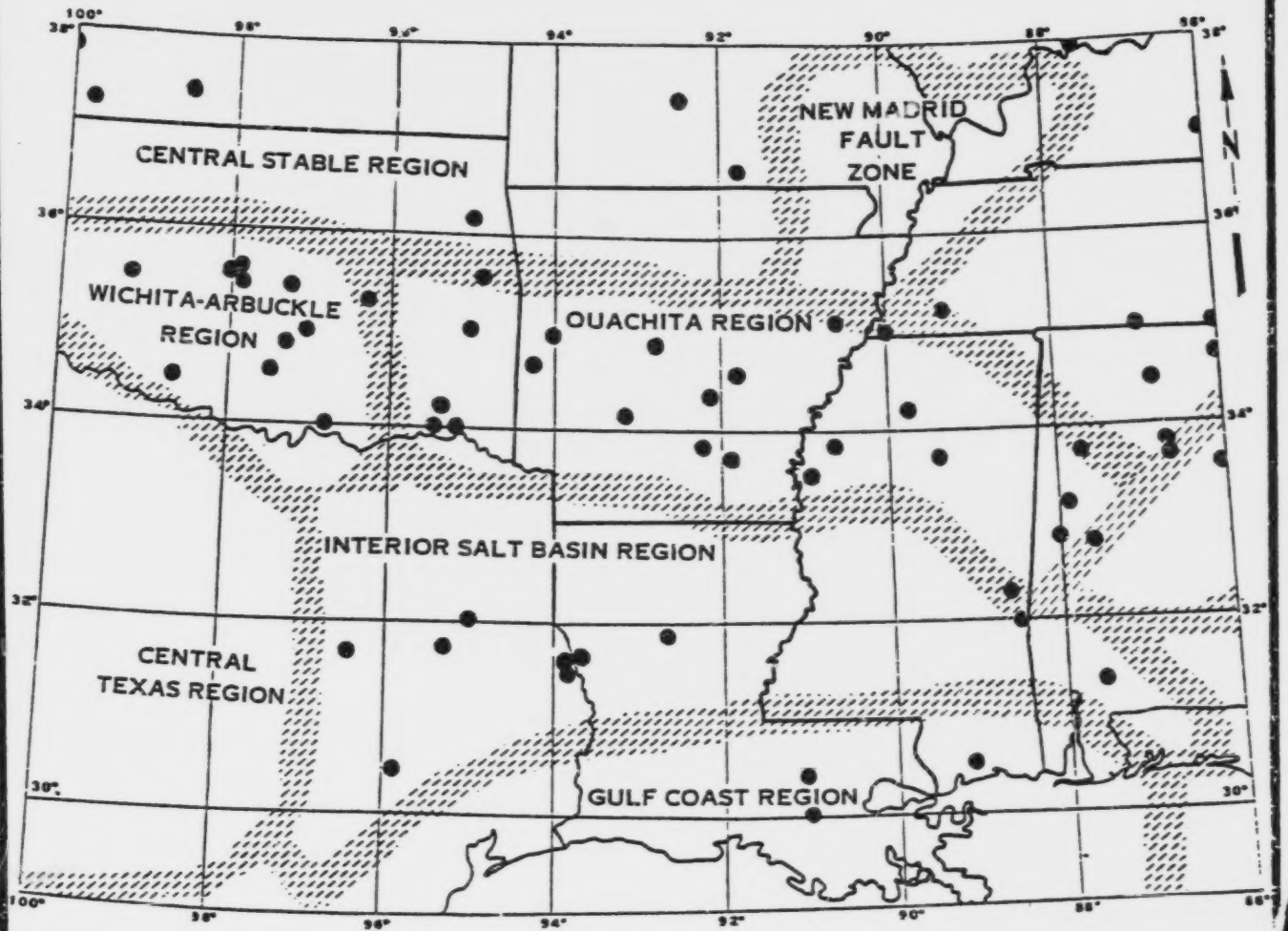
YEAR	DATE	LOCAL TIME	MMI	LOCATION	LAT.	LONG.	FELT AREA (SQ.MI.)	REF.	REMARKS
1977	NOV. 4	05:21	V-VI	ROCKY MOUNT, MS.	33.8	89.3		5	
1978	AUG. 30	18:31	V	DYERSBURG, TN.	36.1	89.4		5	
1978	SEPT. 23	01:33	V	ARKANSAS	33.7	91.9		5	
1978	DEC. 10	20:07	V	MISSISSIPPI	32.0	88.5		8	
1979	FEB. 27	02:25	V	JEFFERSON CO., AR.	34.4	92.1		13	
1979	FEB. 27	16:55	V	STRAWBERRY, AR.	35.9	91.3		13	
1979	MARCH 3	22:37	V	OKLAHOMA	35.5	97.8		8	
1979	JUNE 10	23:12	V	TN.-MO. BORDER	36.2	89.6		13	
1979	JUNE 25	12:11	V	POINSETT CO., AR.	35.6	90.4		13	
1979	NOV. 5	10:35	V	MO.-AR. BORDER	36.5	91.0		13	

*ESTIMATE

BEST DOCUMENT AVAILABLE

T-139810

AF 12338A



NOTES

THE EPICENTERS PLOTTED CORRESPOND TO EVENTS WITH MODIFIED MERCALLI INTENSITY OF IV - V OR GREATER

EPICENTERS WITHIN NEW MADRID FAULT ZONE HAVE NOT BEEN PLOTTED DUE TO HIGH DENSITY SPACING AND SCALE LIMITATIONS.

SEE TABLE G-1.1 FOR LIST OF EVENTS

LEGEND

SEISMO-TECTONIC REGION BOUNDARY

EARTHQUAKE EPICENTER (ONE OR MORE EVENTS)

100 0 100 MILES

160 0 160 KM

PREPARED W.O.S DATE 12/11/80

REVISED ____ DATE ____

REVISED ____ DATE ____

APPROVED GHE DATE 12/22/80

T-1594-1

NATIONAL WASTE TERMINAL STORAGE PROGRAM

GEOLOGIC EVALUATION GULF COAST SALT DOMES

LAW ENGINEERING TESTING COMPANY MARIETTA, GEORGIA

EAST TEXAS STUDY AREA

APPENDIX G-1

EPICENTRAL LOCATION MAP

JOB NO. MV9700 FIGURE G-1.1

☆USGPO: 1982 — 559-099/5360

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